

AUGUST  
1945

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# Public Works

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Landscaping a Sewage  
Treatment Plant  
Keeping Records of County  
Bridges and Culverts  
Constructing the World's  
Largest Concrete Water  
Tank

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LIBRARY

## READY THIS MONTH

### The New 1945

## MANUAL OF WATER WORKS EQUIPMENT AND MATERIALS



Engineers and superintendents use their Manuals when selecting equipment and materials.

## THE YEAR 'ROUND EXHIBIT

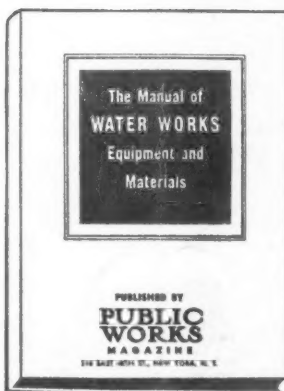
### OF WATER WORKS EQUIPMENT AND MATERIALS

## Telling what is available, what it will do, and who makes it.

The Manual is a great time-saver for everyone who buys, specifies, or uses equipment and materials for waterworks.

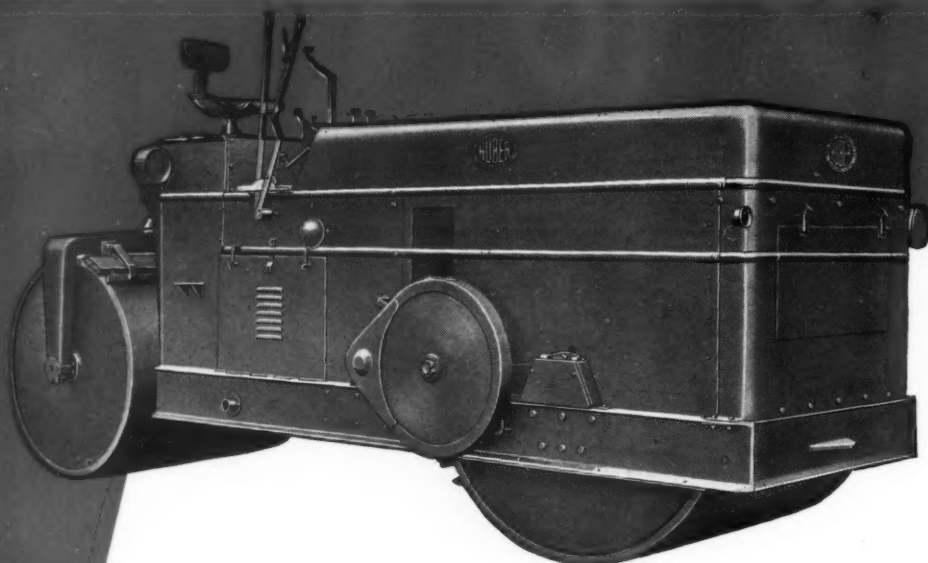
To make such a selection wisely necessitates a knowledge of all that is available. The Manual aims to furnish just such knowledge. In it is described and illustrated in an organized way all the latest and tested products of American manufacturers for use in modern waterworks.

The Manual describes *every* type of equipment and material and explains what each is intended to accomplish. The data are arranged in chapters to make it easy to learn what is to be had, what it will do, and who makes it.



By this plan much tedious searching of manufacturers' catalogs is made unnecessary. And there is the added advantage of assurance that all information in the Manual is accurate and up-to-date. It is completely revised annually.

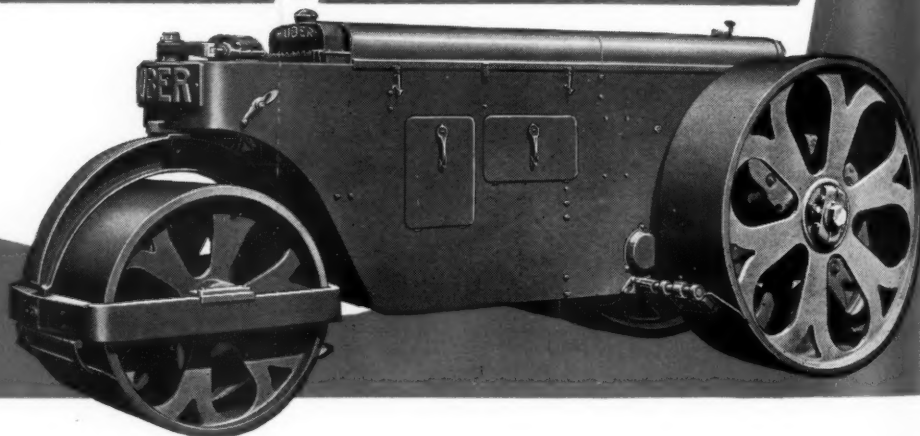
If the Manual is referred to each time you are selecting waterworks equipment or material, it will insure you against overlooking any source of supply. The 1945 edition is being distributed during this month and next. If you do not receive one and can use a copy, write for information on how to obtain it. PUBLIC WORKS Magazine, 310 East 45th St., New York 17, N. Y.



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H-4



# PUBLIC WORKS

Founded in 1896

Devoted to the interests of the engineers and technical officials of cities, counties and states

Vol. 76 No. 8

A. PRESCOTT FOLWELL, Editor

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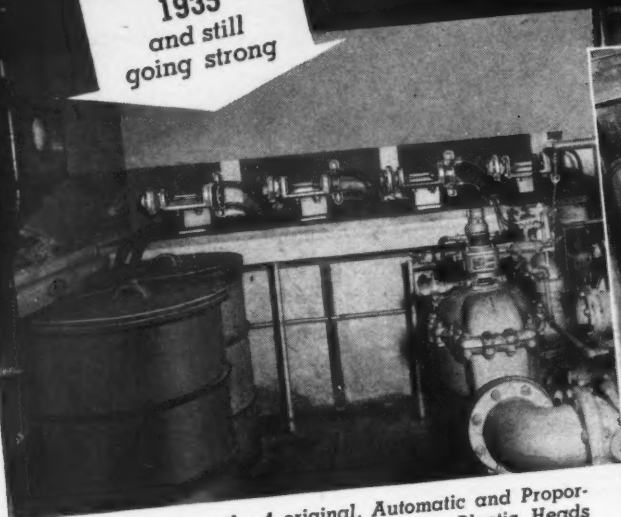
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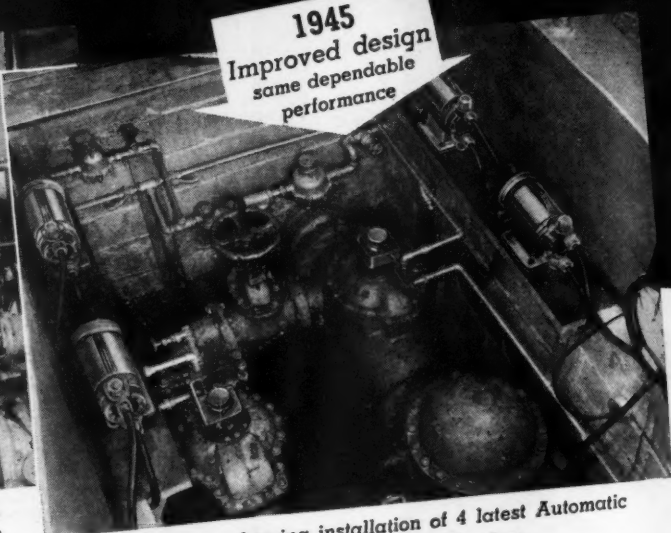
# WINCHESTER, MASS. RE-ORDERS %PROPORTIONEERS%

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At South Station, the 4 original, Automatic and Proportional Chlor-O-Feeders modernized with Plastic Heads are still in use.

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same dependable  
performance



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dependably at North Station, two feeding hypochlorite and two Calgon.

In 1945, the same Water and Sewer Board members, thoroughly satisfied with the performance of this equipment, selected the latest %Proportioneers% Automatic and Proportional Chem-O-Feeders to handle the hypochlorite and Calgon feeding at the North Station.

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When you need special information—consult the classified READER'S SERVICE DEPT., pages 71-73



# WAR and POSTWAR EMERGENCIES



## FWA Advances for Planning Postwar Work

The Federal Works Agency has announced advances of funds for planning twenty non-Federal postwar public works in seventeen communities, aggregating \$80,557. It is estimated that these works will cost \$3,001,249. The money will be made available through the Bureau of Community Facilities, FWA, and is to be repaid to the Federal Government when the projects are undertaken.

About two-thirds of the amount advanced was for waterworks, sewerage and streets. The total advanced for the seven waterworks projects was \$24,482, for work estimated to cost \$928,095. That advanced for the four sewerage projects was \$11,605, for work estimated to cost \$356,037; and for streets, \$20,585 for work estimated to cost \$762,218. The other projects were for a court house, a municipal building, a school, and a hospital.

## Highway Equipment Motion Picture Film Wanted

With a view to stimulating postwar sale of road building equipment made in this country, the Office of Inter-American Affairs desires to assemble some 16 mm motion picture film to send to Central and South America, showing highway construction equipment in action. Manufacturers or others having such film are asked to contribute it for this purpose.

Complete reels are not necessary, as the Office of Inter-American Affairs will make up the montage. In submitting these action films, both a positive for study and the negative for reproduction will be required. All details of preparation, including sound tracks in Spanish and Portuguese, will be handled by the Office of Inter-American Affairs.

## To Obtain Surplus O.C.D. Fire Pumps

Shortly after the beginning of the war the Office of Civilian Defense distributed about 9,000 emergency fire protection pumps throughout the country. These pumps were all of 500 gpm capacity, some front-end mount, some skid mounted and some trailer mounted. The OCD has been liquidated and its property, including these pumps, transferred to the Department of Commerce, as surplus war property.

The Secretary of the American Water Works Association suggests that some water works executives may wish to acquire one or more of these pumps; and if so, that he first find out if there is any such pump in his own, or a neighboring city and inspect it thoroughly. (The pumps are sold "as is," with no guarantee.) Then make sure that no other governmental agency has made a prior offer. Then advise the Director of OCD property in Washington that you wish to purchase this pump, giving its exact location at present and its OCD serial number, which will be found on the name plate. Address—"Director OCD Property, Department of

Commerce, Washington 25, D. C." and ask him to set a price on it.

"Advise him that under the terms of Order U-1 a rating of AA-1 will be applied to the purchase. Under the terms of the Surplus Property Act, Federal agencies, states and their political sub-divisions, including municipally owned water works systems, have prior rights in the purchase of Government surplus property. Orders bearing War Production Board ratings will be filled ahead of unrated orders. The application of an AA-1 rating for municipally owned water works plants, therefore, puts them in a very preferential position.

"The Director of O.C.D. Property, or his assistants, will incline to bargain with you concerning the price to be paid for the pumps. There is no fixed price schedule on any of this equipment. You should be prepared to bargain in your own behalf. It is known that current prices for some of the pumps are higher than the prices that were paid by the O.C.D. It is also reasonably understood that the O.C.D. does not expect to sell these pumps at 100% of their purchase price. You must be prepared to use good judgment to the end that you pay no more for the equipment than it is worth to your department and no less than a fair return to the Federal Government."

## Engineers and Scientists Needed

The Office of Scientific Personnel of the National Research Council and the American Council on Education have issued jointly a bulletin in which they predict a postwar shortage of engineers and scientists. It was estimated that the needs of American industry totaled 40,000 engineers and scientists in June, 1944, about the number that were graduated in 18 months by American colleges and universities in normal times. Thus the education of these men was already a year and a half in arrears then, and is at least two years now.

"To maintain its way of life the United States must have . . . increased numbers of high grade scientists and engineers with adequate facilities at their disposal. . . . Much of the world is going to depend on America for help in becoming a going concern again. In many cases this means the re-establishment or the creation of whole new technologies. America is apparently going to follow a policy of fostering the technological well-being of our world neighbors." Also the Federal government is expected to increase its use of highly trained technical personnel; and reconstruction of war-damaged installations in foreign lands "will no doubt be contracted for with American firms with the use in foreign lands of American personnel for longer or shorter periods. Finally, American personnel will undoubtedly be sought after for direct hire to assist the rebuilding or expansion of technological establishments."

# Wherever planning



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General view of the sewage treatment plant. The row of Lombardy poplars back of the pumping station is shown on the next page.

## Our Cities' Back Yard

Landscape gardening of the Bloomington-Normal (Illinois), Sanitary District, and its appeal to the non-technical citizen.

By EUNICE CASSIDY HENDRYX

Who lives in Bloomington and is proud of its treatment plant

*This is not an engineer's description; but we thought it might stimulate sewage plant officials in other cities to beautify their own plants if they could realize how much higher it would raise both their plants and themselves in the esteem of their fellow citizens.*

*This plant serves a population of about 35,000, including 3,200 at the University and 800 at a State institution. Combined sewers bring an average dry-weather flow of 5.40 mgd to the plant, which consists of a mechanically cleaned bar screen and a grit chamber with continuous removal mechanism, a two-story settling tank, trickling filters with fixed nozzles followed by mechanically equipped settling tanks, and both open and glass-covered sludge beds.*

**W**OULD you be astonished to have thousands of visitors, people from every state in the Union, from Canada and Mexico, come to visit your back yard? Believe it or not, that is what happens to us. But there's a reason. Ours is no ordinary back yard! Out beyond the tracks, past the "Cabbage Patch," tourists and beauty lovers find this fascinating spot

—the Sanitary Treatment Plant, commonly called by the misnomer Sewage Disposal Plant.

Chick Sales' "Specialist" boasted of his skill in making the old "two-holer" an artistic piece of architecture. Grandma tried to camouflage the unprepossessing but very necessary little outhouse with blue morning glories or trumpet vines. Both of these artisans found it a little disconcerting to mention the object of their endeavors in polite society. Not so the Bloomington-Normal (Illinois) Sanitary District. The trustees and staff aspired to demonstrate the possibilities of sewage and to say with a garden of flowers what the lily said, ". . . From slimy depths I rose, aspiration upward grows."

In selecting a site, natural drainage required that the lowest area in the community be chosen. The site eventually located and purchased was an ugly tract of land part of which had previously been dug out as a sand pit. Here the Twin Cities erected the several buildings necessary for transforming the raw sewage, which formerly polluted Sugar Creek, into inoffensive, wealth-producing substances.





The row of Lombardy poplars and, at the left, one of the original elms.

The seven main steps in the process require one small building to house the grit chamber, a large pumping station, and a less ornate building to cover the dosing tanks. Architecturally the pumping station is the gem of the group, with clinging ivy now almost covering the stone-trimmed yellow brick walls from the velvety green sod to the red tiled roof. Here in a sunken apartment with floor and walls of terrazzo are stationed three electrically operated pumps with a combined capacity of 14,000,000 gallons per day. The first floor contains a central lobby and a very completely equipped, immaculately clean machine shop. The wide windows of the second floor with its office rooms, chemical laboratory, and attractive room for meetings of the trustees, command enchanting views of the spacious grounds.

Six parallel channels 90 feet long and 28 feet wide comprise the primary settling tanks, into which the sewage is pumped from the grit chamber. The embankment surrounding these tanks, which rises 18 feet above the general level of the grounds, was at first sodded. Mowing this sloping terrace was an arduous task. Trailing junipers planted at regular intervals have now grown into a solid mass of green, preventing erosion and making mowing unnecessary.

Beyond the primary settling tanks the dosing tanks, great vats holding 35,000 gallons of liquid each, are flanked on either side by sprinkling filters, 276 feet long and 197 feet wide, comprising an area of two and a half acres for the total filter bed surface. In this spectacular unit, sprays from 286 nozzles discharge at 4 to 5-minute intervals their now clarified water into the air. The water filters through a bed of crushed stone eight feet deep, runs by gravity into the secondary settling tank where the final and last clarification is effected, and is now ready to be turned into Sugar Creek.

Sludge drained from the primary settling basins and dried in outside beds or under a glass covered building, in accordance with weather conditions, is easy to handle. Upon exposure to the air it crumbles into an odorless coarse meal as inoffensive as finely

pulverized soil. The green expanse of lawn, the thriving shrubbery, and the luxuriant flowers testify the value of this fertilizer which keen-sighted gardeners carry away by the sackful.

In the beginning a few large elm trees offered the only natural adornment. These magnificent old trees now have much company. More than 15,000 shrubs and trees have been planted and have grown vigorously in size and beauty. A row of Lombardy poplars makes a scenic back drop for the pumping station. Hardy magnolias and Asiatic flowering crabs add their exotic beauty and fragrance. Hedges of hybrid lilacs and trellises of Dorothy Perkins roses frame the filter beds. Close by in the drift, where they may catch the zephyr-borne mists, dahlias flaunt ribbon-petaled blooms of crimson, pink, and bronze—many blossoms as large as dinner plates.

All this may be seen from the car window as visitors follow the smooth, curving drives. But the ardent beauty lover parks his car, strolls afoot, and lingers long in the rock garden. A narrow path near the entrance to the grounds leads into this unique garden, once the ugliest spot in the whole site. Three years were spent in building a series of slopes and hillocks in an area originally a hollow most difficult to drain. Tons of native boulders of various shapes ranging from pebbles to a piece of granite weighing eleven tons were brought in from far and near. These were placed so as to make what appeared to be a natural setting for a display of flowering perennials and more than a hundred dwarf conifers. Since boulders are rare in this area, which is noted for its level surface, and rich black soil, the beautifully marked stones in themselves are of peculiar interest.

Visitors marvel at the source of a tiny waterfall gushing down from the highest point of the garden to form a small stream which meanders to a garden pool and fish pond. On its way it gentles along over a level section of glistening vitrified tile bridged by a single stepping stone. The shining tile basin reveals the constant clarity of the water. Near the end of its course a neat sign dissolves the mystery of the miniature cascade. The water piped to it is *purified effluent from the sewage*. Goldfish, snails, and turtles



From the waterfall, the sewage effluent meanders to a garden pool and fish pond, as shown on page 17.

luxuriate among the lotus and the water lilies in the pool—the most striking evidence possible of the purity of the water.

The sewage plant, through this landscaping, has become a bird sanctuary. Robins, goldfinches, and cardinals find the waterfall an ideal spot to cool their plumage while perhaps a red-winged blackbird keeps watch from the topmost branch of a glamorous white birch. Martins, glistening blue-black, soar overhead as they encircle the garden from their elaborate apartment house high on a pole nearby. Busy little wrens warble and chatter constantly to their young in yellow gourd bungalows thoughtfully provided for them. Melodious notes from the brown thrush blend with the soft cooing of the gentle grey dove. Scores of tiny bank swallows cling to the walls of the secondary settling tanks where they breakfast at dawn and dine in early twilight.

The rock garden is ever changing—tulips, jonquils and hyacinths in early spring, followed by columbines and violets. The beauty sequences alternately dazzle and rest the eye: splashes of vivid scarlet and royal purple petunias; borders of white alyssum and blue ageratum; old-fashioned moss trailing over smooth white stones; coxcombs, red and velvety as grandma's old plush sofa; day lilies—yellow, gold and orange; dwarf iris with spearlike foliage and dainty flower heads, creamy white, soft blue, and delicate lavender. To the left of the rock garden a bed of several hundred peonies attracts Memorial Day visitors. Gorgeous red and white blooms hang heavy on their stalks and fill the air with their spicy fragrance for this, the



The effluent stream below the waterfall passes through a glazed tile channel which reveals its clarity.

most sacred of our national holidays.

In the rose garden dozens of varieties delight the eyes of flower lovers with continuous bloom throughout the season. A child will thrill at the sight of a plump bunny standing on his hind legs to nibble the soft delicious petals of his favorite rose. Though the bunnies are sometimes destructive, they are protected. Baby rabbits, sensing their security, since dogs and hunters are barred, allow one to pass close by. Quails and ringnecked pheasants feed under graceful sweeping branches of spirea.

Scores of motorists come daily during the spring, summer, and fall, especially on Sundays and holidays. Classes from schools and colleges in adjoining cities

(Continued on page 20.)



One corner of the rock garden with the primary settling tanks in the background.

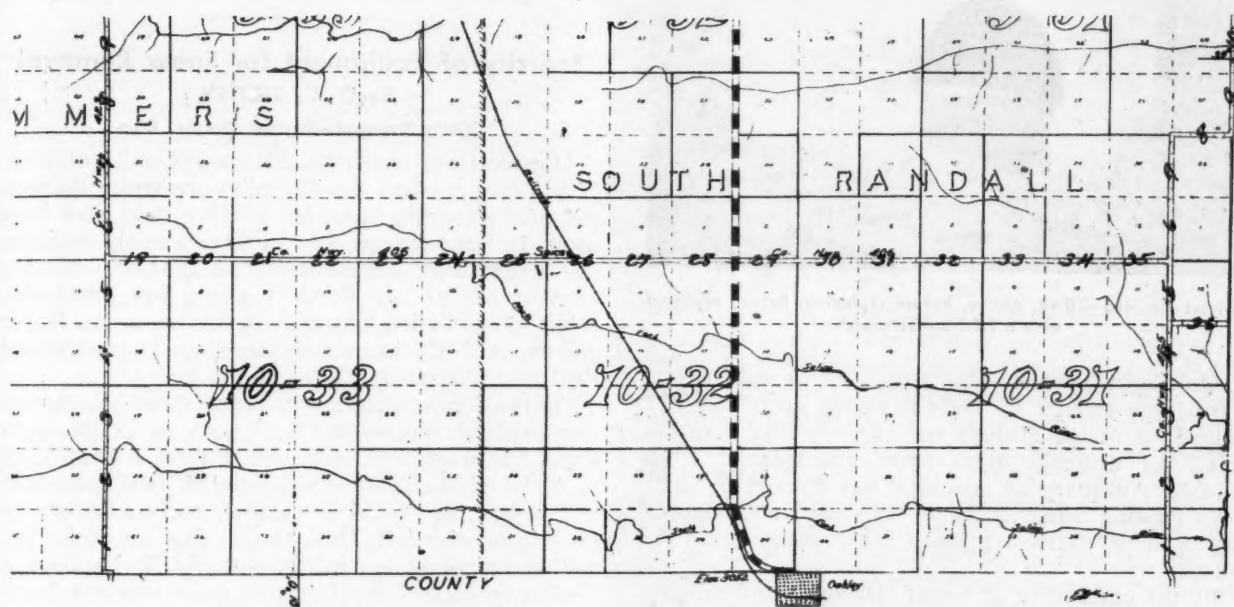






# Records of Bridges and Culverts

Method of so numbering each culvert and bridge as to indicate what road it is on and its location on that road. Collecting data concerning each structure and designing new ones.



Map of the southeast corner of the county, showing system of numbering. Heavy broken line is Route U. S. 24.

would be on County Highway #364 and in the 10th mile from the West end of the highway.

After this part had been completed, the regular highway crew was instructed to use forms that had been prepared and printed and fill them out as to size of culvert or bridge, type of headwalls or wings, if any, and length of culvert or bridge, width of roadway, and estimated drainage area. At the same time the structure was inspected and the general condition of the culvert or bridge was noted, as to washing, clogging, or if the channel was clean, and if any overflow had happened, and if the fill was in good condition. At each culvert or bridge the speedometer reading of the vehicle which they were using was recorded to the

nearest 1/100 in the mile. Thus, culvert or bridge #364-10.45 means that the culvert or bridge is on highway 364-10th mile and located .45 mile from the West end of the 10th mile.

Using a township map drawn to the scale of 2" = 1 mile and aerial photographs with a scale of 4" = 1 mile, the general contour of the streams and draws, with size of lagoons, etc., were drawn on the township plats by the use of a pantograph. This gave fairly accurate results as to the stream or draw location in each section of ground. Upon completion of these maps, the drainage areas were figured and checked against the field inspection report. (In practically all cases the field inspection estimate was too small, the map giving larger drainages except on small areas of 160 acres or less.) The bridges and culverts were plotted on the township maps in their proper location and the drainage areas shown and also size of waterway opening with culvert number.

Present plans are to bring all elevations of bridges, culverts and highway profiles to Coast and Geodetic datum. This will be done at the same time that field work is performed for planning work on the Federal Aid Secondary System. All this information will be used in planning new drainage structures to replace the present inadequate structures and to bring the present highways to a higher standard of development.

Several facts were shown in this inspection, namely:



Cumberland bridge, No. 439-11.3.



Culvert No. 465-30.40. Above, before replacing. Below, replaced with a 7-ft. concrete arch.

1. Only approximately 1% of the bridges and culverts were large enough for their drainage areas and (2) only 58% of the bridges and culverts that were too small for drainage areas have caused little or no trouble. Adequacy of openings was figured by Talbot's formula using .20 to .60 as coefficients, depending upon the characteristics of the drainage areas involved.

By the purchasing of larger structures and relocating the present structures, the entire county highway system should have adequate drainage facilities in the next few years.

The equipment used in the work described above was a polar planimeter, 50 ft. tape, Locke hand level, and pantograph.

This project is not completed entirely at present, but is sufficiently so to show that it is well worth while. This program can be changed to fit any certain county's own problems and highway programs.

### California's Transportation Map Now Available

A revised edition of the California transportation map, consisting of 21 sheets, has been prepared by the Public Roads Administration of the Federal Works Agency for general distribution.

The map, drawn to a scale of four miles to the inch, shows in color the location and character of all State and Federal-aid highways, important secondary road connections, airports, canals, navigable streams and other transportation facilities in California. Boundaries of national and State forests and parks, Indian reservations, wild-life refuges and recreational areas, and roads leading to them, also are shown.

The highway information was prepared by the cartographic section of Public Roads and superimposed upon base maps compiled by the United States Geological Survey.

The California map is one of a series of State

transportation maps which the Public Roads Administration has issued at intervals since 1936. Maps have been published for 26 States. Maps for 11 other States are in process of compilation or awaiting final printing. They are printed on sheets of uniform size, 26 by 36 inches, and are too large to be used conveniently for touring. They are designed primarily for use by the War Department and other Government agencies, and by State and county highway engineers and planning agencies.

Copies of the California map may be obtained from the Superintendent of Documents, United States Government Printing Office, Washington, D. C. The price for the complete set of 21 sheets is \$5.50. A limited supply is reserved by the Public Roads Administration for distribution to qualified educational institutions, public libraries and State and county officials.

### Scarcity of Equipment for Snow Removal

By O. C. RICHEY

County Engineer, Morrow County, Ohio

Morrow County, Ohio, contains 948 miles of road, of which approximately 400 miles are under the control of the county, including keeping them free from snow. In some winters we can do this easily with our five maintainers, but the winter of 1944-45 taxed the capacity of our two Burch V-plows, two Burch side plows, three Galion hydraulic maintainers, one Huber and one Allis-Chalmers maintainer, working night and day from December 11th to March 1st.

On the former date a wet, heavy snow fell. A narrow roadway was opened for travel on all the highways, but five days later, before these narrow lanes could be widened, snow with wind drifted them full; and before they could be cleared, rain and cold covered them with ice. This was the last straw for our equipment, which is getting quite old. We had put a V-plow on each of two International trucks and 2 side plows on two other trucks. When these broke down we put a V-plow on a Galion maintainer which worked a little better. Finally we widened most of our roads with a 12 ft. and a 10 ft. pull grader attached to a Caterpillar tractor 60 and a Caterpillar Diesel 50, also hiring a contractor with a crawler-type bulldozer to handle some of our roads.

### Our Cities' Back Yard

(Continued from page 17)

as well as those in Bloomington and Normal make regular trips not only to study the operation of the plant, which is one of the most efficient in the state, but also to see and enjoy the beautiful grounds. The garden is a Mecca for camera fans, amateurs and professionals. Earliest dawn often finds tripods set, artists waiting the first peep of day. Twilight finds them loath to leave.

The most remarkable fact about this extensive and elaborate landscaping is that all this beauty was brought into being at very nominal cost by regular employees of the plant when they had time from other duties, with the assistance of some WPA labor and the services of one part-time gardener. As one creative idea leads to another, the attractive landscaping at the treatment plant has given impetus to further beautification projects in our cities' post-war planning. Sugar Creek is being visualized as a terraced parkway with a flower-bordered bridge path, a road for cyclists, a scenic trip of several miles across the urban area and ending in our beautiful back yard.



# Balancing Strength of Sewage During Sedimentation

Investigations of operations at the treatment works of Birmingham, England, which treat the sewage from 870,000 population, and tentative conclusions drawn from the results of a number of experiments with primary and secondary sedimentation tanks.

By S. H. JENKINS, D.SC., F.R.I.C., C. H. HEWITT and  
F. W. ROBERTS, F.R.I.C.

**S**EDIMENTATION is well recognized in the biological treatment of sewage as an important preliminary process which reduces the total amount of impurity and also tends to minimize fluctuations in the composition of the sewage. Despite the importance of the process, it cannot yet be claimed that sufficient information is known to forecast the performance of a sedimentation tank. For the most part such tanks are designed on the basis of their capacity and nominal time of retention along lines laid down by the Royal Commission on Sewage Disposal of 1902-1915, with such improvements suggested by practical experience as have been gained since that time. These improvements have aimed at more uniform distribution of the inflowing sewage and better means of withdrawing the tank effluent, at reducing to a minimum turbulent conditions which might hinder settlement or disturb settled solids, and at removing sludge by mechanical devices.

Improvements in sedimentation tanks might result either from the application of theoretical considerations, or from practical experience—i.e., by correcting previous faults in design or by developing contrivances of proved success. Insufficient is yet known about the settling properties of sewage solids to be of great assistance in designing tanks. As for the results of practical experience, it is surprising that while in some cases detailed observations on the operation of sedimentation tanks have been published few attempts have been made to examine the results critically and to profit from the conclusions. The work of Holroyd (1) is a notable exception in that the results and the methods whereby they were obtained were subjected to critical examination.

At its various works, the Birmingham Tame and Rea District Drainage Board operates sedimentation tanks differing greatly in design and performance. It was decided to include in the board's program of research on sedimentation a detailed study of the process as applied to works practice. This preliminary paper records the results of observations at Saltley Works, where the bulk of sewage from Birmingham and district receives sedimentation. It is mainly concerned with describing the balancing of strength of sewage during sedimentation in tanks which perhaps are typical of some in use at older works.

The sewage from about 870,000 inhabitants, including the trade effluent from a variety of industries, enters the works by three sewers, and after passing through a detritus tank flows through submerged inlet ports into five horizontal-flow primary sedimentation tanks.

Flows in excess of six times the dry-weather flow

are diverted at the works to the River Tame over a weir set in a wall of the detritus tank: at least one primary tank is out of use on five days each week for desludging. The primary effluent receives further settlement in three secondary sedimentation tanks. Gas liquor enters by a separate cast-iron sewer, and is admitted either to the sewage or to storage tanks from which it can be pumped into the primary tank effluent.

## Description and Results of Experiments

*Experiment 1.*—This experiment was carried out in dry weather. It is calculated that the average time of retention in the primary tanks was 4.5 hours and 2.7 hours in the secondary tanks. These figures are reduced to 3.4 and 2.3 hours respectively if suitable allowance is made for the capacity of the tanks occupied by the sludge. Separate samples were taken hourly for twenty-four hours of the crude sewage and effluents from the primary and secondary sedimentation tanks. The first sample of primary tank effluent was taken four hours, and the secondary tank effluent eight hours after the first sample of sewage. The results indicated that the primary and secondary tank effluents varied in the same way as the sewage.

*Experiment 2.*—This experiment was repeated during a wet spell when the settling tanks were working at a maximum capacity, and the storm-water tanks, which have a capacity equal to nine hours dry-weather flow, continuously discharged effluent to the River Tame; the six times dry-weather flow weir came into operation during the sampling period. Nevertheless, the sewage varied sufficiently in strength for the purpose of this test. The results showed that under these conditions the primary tank effluent fluctuated according to the variations in the strength of the sewage, except, perhaps, that the peaks and troughs were less pronounced. The levelling process continued during secondary sedimentation, but it is obvious that at maximum flow and with a diluted sewage fluctuations in composition of the primary tank effluent cause comparable variations in the strength of the secondary tank effluent.

*Experiment 3.*—In this experiment, carried out in dry weather, the admission of gas liquor to the sewage was controlled so as to cause increased variation in the strength of the sewage. Considerable hourly fluctuations of the primary tank effluents were observed, although not so marked as those of the sewage. The variations in the impurity content of the secondary tank effluent, while noticeable, were less marked than in the case of the primary tank effluent.

The general conclusions drawn from the first three experiments were: (1) During primary sedimentation in tanks giving nominal retention of 5.1 hours to the



dry-weather flow and 1.7 hours at three times dry-weather flow, the sewage reaching Saltley Works undergoes substantial balancing in strength. Marked variations in the composition of the sewage result is noticeable, though smaller, variations in the primary tank effluent. (2) Sewage balanced in strength to the extent possible in primary tanks is balanced still further during sedimentation in secondary tanks having a capacity which may vary between 2.3 and 5.1 hours in dry weather. The process of balancing is far from complete under these conditions.

**Experiment 4.**—A more detailed examination of variations in composition of the secondary tank effluent was made on four successive dry days from December 18-21, 1944. The minimum flow from the secondary tanks occurs at 7-8 a.m., and the maximum at 5-7 p.m. In this experiment spent gas liquor was admitted to the tank influent at a rate of about 90,000 gallons per twenty-four hours for two periods of three hours, from 6 a.m. to 9 a.m. and from 12 a.m. to 3 p.m., in order to strengthen the influent during these periods. It was intended to balance the flow to the maximum extent possible on December 18th and 20th, and to operate the tanks at the minimum weir level on December 19th and 21st, to see if any additional balancing of strength resulted from the balancing of flow. However, owing to restrictions in the free flow of secondary tank effluent to the filter beds  $4\frac{1}{2}$  miles away, it was not possible to lower the level in the tanks to the required extent and the rate of flow and total flow were virtually the same on the four days.

The results obtained in Experiment 4 confirmed the conclusion drawn from Experiments 1-3 that the secondary tank effluents show less fluctuation in composition than the influents, but that any pronounced tendency for the strength of the influent to rise or fall is transmitted to the effluents. The results also showed that so far as this works is concerned the period of maximum flow is approximately the period when the tank effluent is of maximum strength.

The balancing in strength found to occur during primary and secondary sedimentation led the authors to consider the variation in strength of sewage at different stages in a primary sedimentation tank. For these experiments (Nos. 5, 6 and 7) two of the primary sedimentation tanks were used, each of which had two standing baffles rising nearly to water level. One of these baffles was situated about one-tenth of the length of the tank, and the other, about two-fifths, measured from the inlet end. Series of samples were taken at these baffles, as well as at the inlets and outlets of the tanks. The results, particularly as regards solid matter, were usually worse at the first baffle than at the tank inlet. High results were also often obtained at the second baffle when the tank contained a considerable amount of sludge, but not when the tank had just been desludged.

The results of these experiments suggest that the baffles are responsible for the presence of much solid in suspension which might otherwise settle out. This point is not regarded as proved conclusively, since parallel determinations would be required on samples taken at corresponding distances from the inlet of a tank without baffles.

In the foregoing experiments the assumption is more or less implied that samples taken at fixed intervals of time, hourly or half-hourly, as the case may be, are representative of the whole of the liquid between successive samples. It is not known if this is true even as a general statement.

A test was carried out on February 6, 1945, to find

the variation in strength of sewage and primary tank effluent at Saltley Works at a time when the flow is usually rising. Twenty-one separate samples were taken at intervals of three minutes between 11:35 a.m. and 12:35 p.m. A clean tank, No. 4, was used. The weather was wet and approximately the maximum flow of sewage was receiving treatment. It was therefore thought that with the large volume of storm water present the sewage would show a minimum variation in composition.

The results of this test, Experiment 8, show that the accuracy assignable to a chance sample taken every hour as an indication of the composition of the sewage during that hour may not be of a high order, and raises questions of sampling errors which will be followed up before extensions of this work are attempted.

### Consideration of Experimental Data

The authors do not feel justified in drawing very definite conclusions from their results at this stage of the work. This paper is of a preliminary, exploratory nature, and is presented for discussion in the early stages of experiment, so that its future development might benefit by criticism of its scope, methods and content.

The examination of average samples of sewage and tank effluent may provide a useful outline of the performance of a settling tank, but it should be remembered that oxidation plants are expected to purify tank effluents as they issue from tanks, not liquids represented in strength by the average of samples taken over a relatively long period.

The purpose of a sedimentation tank, it might be argued, is only to remove suspended solid matter from the sewage, and that its capacity is being wasted if mixing permits part of the flow to pass through the tank more rapidly, and part less rapidly than at the designed rate. Settling tanks in this country are normally designed to take three times the dry-weather flow. For such an argument to be tenable it must be shown that when the maximum flow is being treated, sedimentation is less efficient in a tank where mixing occurs than it would be if the whole of the tank were to be used uniformly for settlement. Whether this is so or not depends upon the settling properties of the solids in suspension in the sewage and on the degree of short circuiting.

This statement may be amplified by supposing that  $T$  is the time taken before the first of a number of particles  $n_1, n_2, n_3, \dots, n_x$  of suspended solid which simultaneously enter a tank will appear at the outlet, and that thereafter the times at which the particles reach the outlet are  $T + t_1, T + t_2, T + t_3$ , etc. Then if the curve showing the rate at which the particles fall is a straight line beyond  $T$ , the amount of solid still in suspension will be the same, if the time of retention is greater than  $T$ , whether short circuiting occurs or not.

A numerical example will help to explain this idea. Assume that the sewage is passed through a tank with a theoretical retention period of four hours; in this time 65 per cent of the solid is removed if no short circuiting is presupposed.

Now suppose that owing to short circuiting 25 per cent of the flow appears at the outlet after two hours, 50 per cent after four hours, and 25 per cent after six hours. Then 50 per cent of the suspended solid will have been removed from 25 per cent of the sewage, 65 per cent of the solid from 50 per cent of the sewage, and 80 per cent of the solid from 25 per cent of

(Continued on page 32)

# Wartime Maintenance of Clark County Roads

**Methods and equipment employed in repairing and surface treating 230 miles of bituminous treated macadam roads. During the war, labor shortage has limited retreading to 10 to 15 miles a year.**

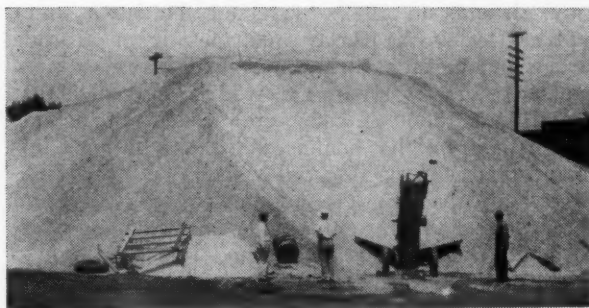
**By O. E. BILLETER**

County Road Engineer, Clark County, Kentucky

**C**LARK COUNTY, Kentucky, maintains 280 miles of roads, of which 230 miles are water-bound limestone macadam base, bituminous treated, and 50 miles are crushed limestone macadam, traffic bound. The county has no indebtedness. The tax rate is 35¢ per \$100 on an assessed valuation of \$22,000,000, of which 15c is for roads and bridges. In addition it receives approximately \$14,000 annually from the State for this purpose.

As soon as the weather permits in the spring we patrol every bituminous road in the county and cold-patch every break and hole. When this has been completed we begin using the distributor, skin patching and surface treating. Roads that are in fairly good condition we spray with oil and cover with  $\frac{1}{2}$ " stone chips. Where a road is dry and raveling, we surface treat with MC3 asphalt and cover with  $\frac{1}{2}$ " stone chips. For spreading chips we use a Buckeye chip spreading machine, which saves quite a bit of labor over hand-spreading. The traffic-bound roads we maintain by adding stone and grading when needed.

Every year we retread (mix on the road) as many miles as possible. Since 1941, because of labor short-



Stock pile of stone chips at quarry.

age, we have been able to retread only 10 to 15 miles each year, and have done no construction of either roads or bridges. After the war we hope to do quite a bit of bridge construction and retreading of roads.

We at present have only two superintendents, one for ditching and bridge repairs and one for bituminous road repairs.

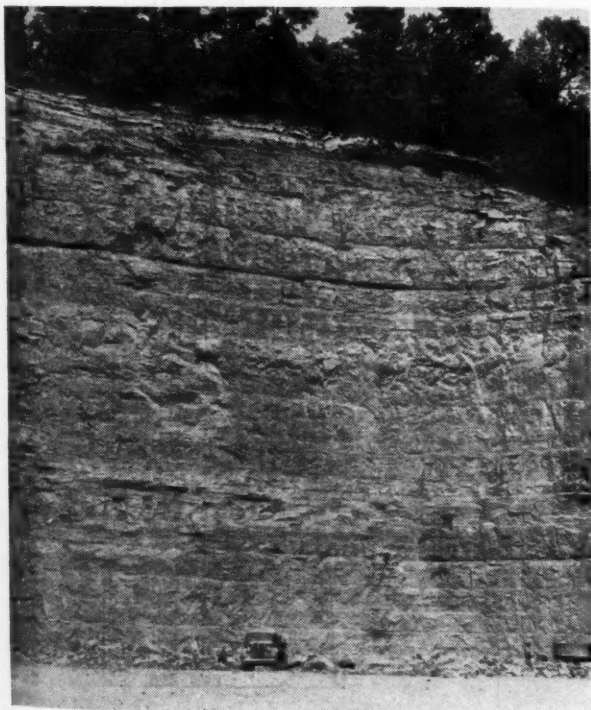
The Road Dept. has a well equipped repair shop, and all the welding and repairing of the machinery is done by one mechanic and a helper.

The county owns two 10,000-gallon tanks for asphalt storage, and a Case 65 H.P. engine for heating the asphalt. This engine formerly was used for operating a crusher plant but was too expensive, but is very economical for heating asphalt.

The county owns twelve  $1\frac{1}{2}$ , 2 and  $3\frac{1}{2}$ -ton trucks: Nine dump trucks; one International  $3\frac{1}{2}$ -ton mounted with 800 gal. Etnyre distributor; one Ford mounted with Schramm air compressor, equipped with hammers and other tools necessary for drilling and other work; and one Chevrolet mounted with a 600-gal. water tank.

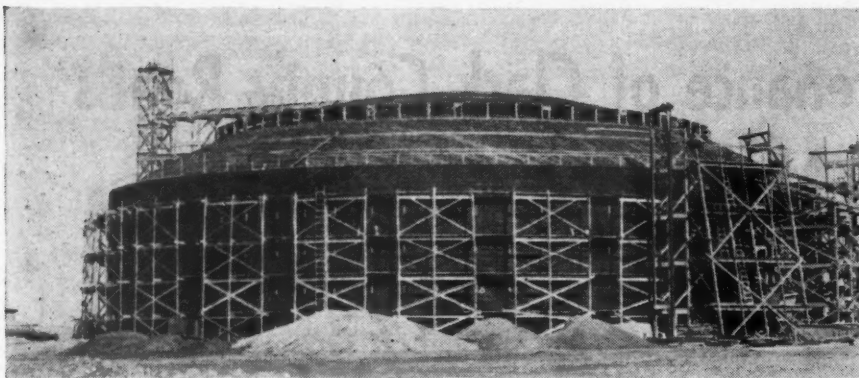
One Adams patrol grader; one International crawler type tractor; one Fordson tractor (used for pulling Austin-Western power broom for cleaning roads); one Adams pull-type grader, 9' blade; one Galion pull-type grader, 9' blade; one conveyor (used for loading stone chips); two Jaeger concrete mixers.

We have a shed at our garage equipped to make 15", 18", 24", 30" and 36" concrete culvert pipe. We also make all road signs. Until the spring of 1941, we operated a crusher plant owned by Caldwell Stone Co. at a rental basis of 10¢ per ton. At that time we had in stock piles twenty thousand tons of  $\frac{1}{2}$ " and  $\frac{3}{4}$ " stone chips, which helped with our maintenance through 1941 and 1942. Since then we have taken bids for chips from local quarries because we have not been able to employ enough men to operate our quarry.



Face of quarry operated by Clark County Road Department.





Great Falls tank during construction.

# Constructing 4,

By M. E. CHAMBERLIN

Chief Engineer, Corwin & Company  
consulting engineers

THE rapid growth of Great Falls, Montana, combined with construction and use of two large Army airfields in 1942, overtaxed the city's water supply. Use by the Army and the higher altitude portions of the city during peak-load days required increased storage. Hydraulic studies indicated that an additional 5000 g.p.m. were needed during the daylight hours of hot summer days, and to meet this demand plans for a reinforced concrete tank of 4,750,000-gallon capacity were adopted by the city and approved by Federal agencies. The tank has an average inside diameter of 156 ft. and is 34 ft. high to the top of the wall and 60 ft. to the top of the dome.

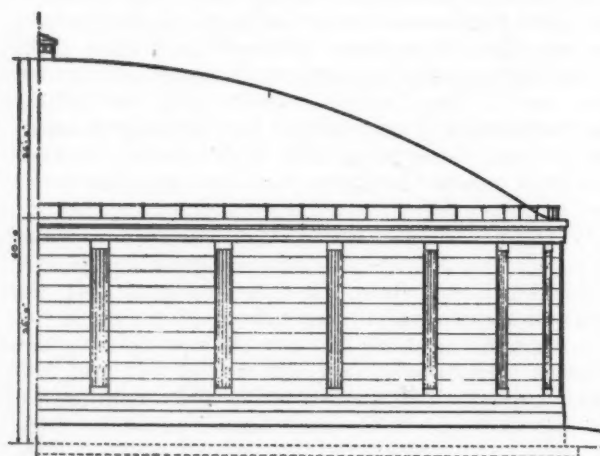
The top elevation of existing storage tanks, the elevation of available sites, and the required capacity determined the tank dimensions within narrow limits. Its exceptional size, perhaps the world's largest reinforced concrete tank above ground, justified special considerations in its design. Studies were made involving watermain connections with the existing system, foundation conditions, various combinations of possible temperature stresses, earthquake tremors, economy of critical materials, plastic flow of concrete, future maintenance, and appearance.

The subsoil, of blow sand and unstable gumbo clay, was excavated to a depth of seven feet and, after sealing the clay with an asphalt-sand mat and placing subdrains, the excavation was filled with mixed sand and gravel rolled in layers. This was tested to support three tons, approximately twice the combined tank and water load, without perceptible settlement.

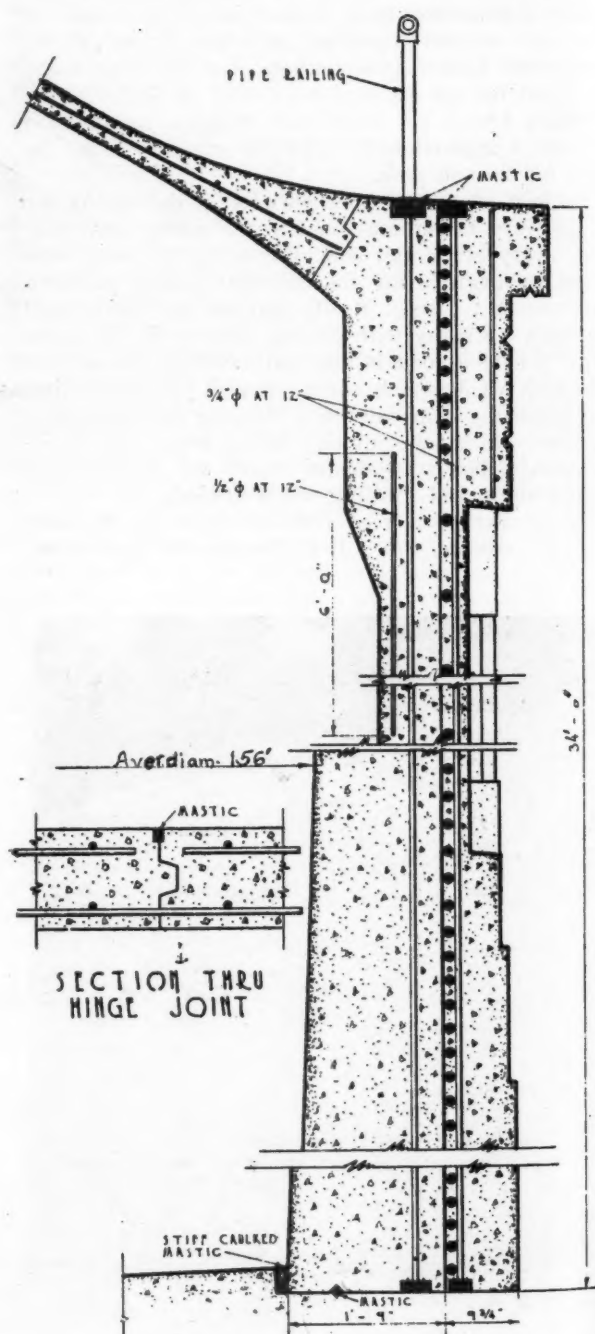
The floor, varying from 9" thick over the control area to 21" under the walls, is divided into seven sections by sealed, hinged joints. Prestressed hoops counteract radial floor stresses caused by horizontal

expansion and elongation of the walls by water pressure.

Expansion resulting from increased temperature,



Half elevation of tank.

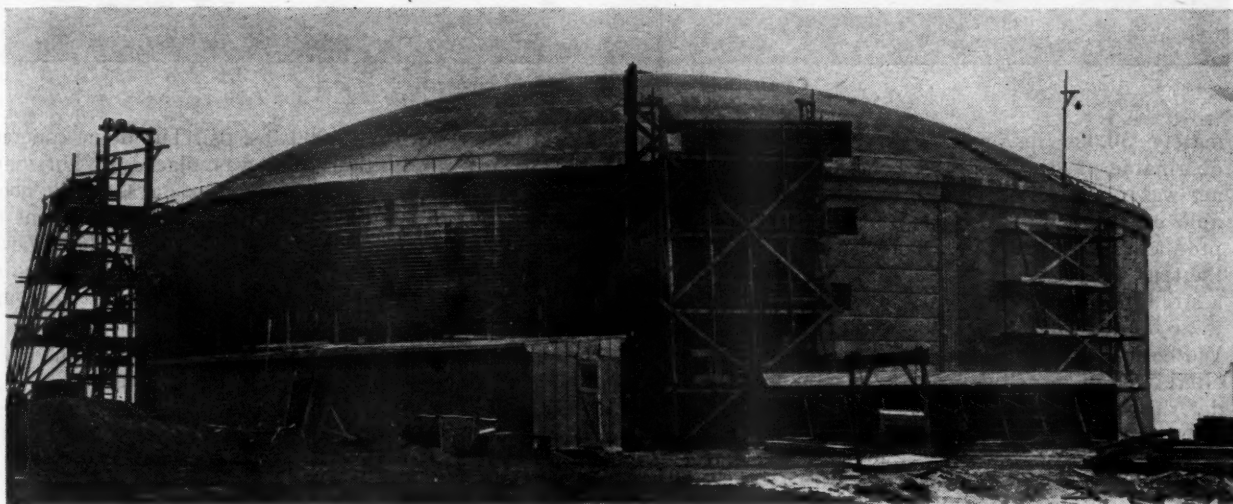


Typical section of wall of tank.



# 4,750,000-Gallon Concrete Water Tank

**Great Falls, Montana, has built what is probably the world's largest reinforced concrete above-ground tank to meet the need for increased storage capacity.**



Tank nearing completion but outside surface not finished.

and horizontal elongation produced by water pressure, tend to move tank walls outward radially. This tendency becomes an actual and perceptible movement whenever such radial force is sufficient to overcome friction between the floor and wall. Preventing it by anchoring the two together sets up critical bending and shearing stresses. Therefore, designing a water-proof joint between floor and wall which permits movement is desirable. This was obtained by making the floor sufficiently smooth to reduce friction, inserting confined mastic, and tamping stiff, expanding mastic into the exposed recess before prestressing the hoops.

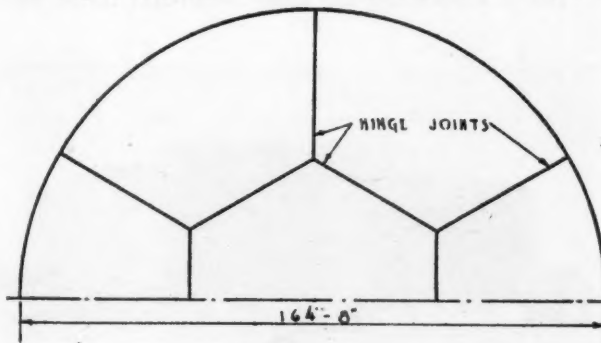
The walls are double; a thicker inside wall to take radial stresses and to support the dome, and a thinner outside wall to cover the hoops and permit architectural treatment. To assure getting concrete of maximum density, the material engineer and contractor prepared trial batches. The proportions agreed upon, with sufficient variations to meeting changing conditions, were:

- 94 lbs. of cement.
  - 195 lbs. of sand containing 4.5% passing a 100 mesh sieve.
  - 276 lbs. of graded coarse aggregate.
  - 1 lb. of admixture to increase plasticity.
  - 5.5 gals. of water.
- Each batch was mixed at least 1-1/2 minutes. Labora-

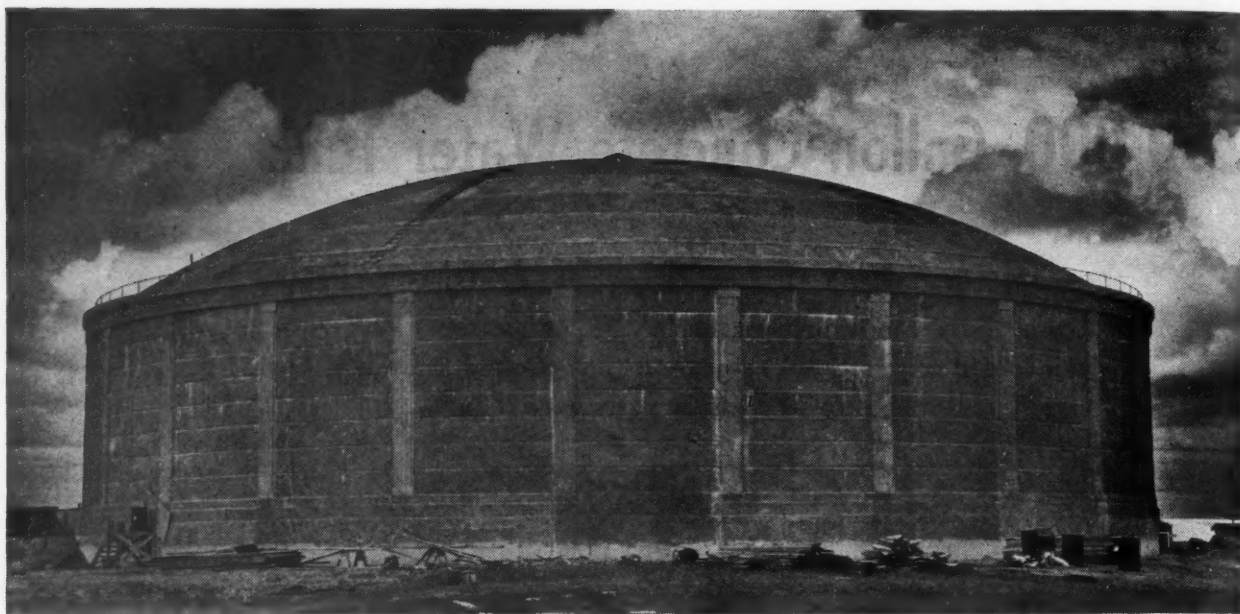
tory test of cylinders showed an average compression strength of 4,300 psi in seven days.

To simplify construction, the walls consist of 26 sections separated by vertical keyed joints without metal plate cutoffs. To materially economize on steel and to secure constant compression in the inner wall concrete, the hoops were designed for prestressing. The minimum hoop spacing permitting use of specially designed turnbuckles was found to be 3". Each hoop consists of 13 bars having an elastic limit of 54,000 lbs. psi, with cold-rolled threads. The lower 59 hoops are of 1-3/8  $\phi$  bars; the upper ones of 1-1/4  $\phi$  bars.

Computations indicated that a prestress of approxi-



Half floor plan.

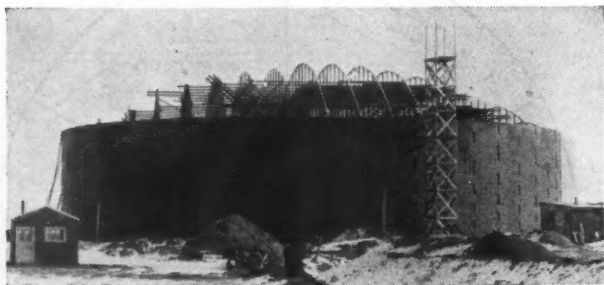


Constructing outside wall, with its pilasters.

mately 30,000 lbs. psi would be needed, after the obtainable plastic flow was secured, to safely counteract water pressure, possible temperature and improbable earthquake stresses, further plastic flow, and to produce 50 lb. psi compression in the concrete with the tank full of water. When the concrete had obtained a strength of 5,000 lbs. psi the hoops were prestressed to 20,000 lbs. psi and 30 days later to 32,000 lbs. psi. We believe this prestressing during the 30-day period eliminated 50% of the probable plastic flow. The stress determinations were made with a micrometer-type 48" strain gage. Considerable difficulty was met in preventing the hoop bars from turning during prestressing; probably square bars would have prevented this trouble. Specially designed turnbuckle wrenches were required. All vertical bars were greased, wrapped and finally prestressed, chiefly to prevent horizontal cracks.

A great deal of credit is due Fred Dudley, of the contractors Dudley & Anderson of Great Falls, Montana, for his carefully studied form designs and construction methods. Wall forms were portable and of the same size as a wall section. Frames for outside forms were combined with hoisting and runway supports. Outside face forms were in carefully fitted sections and were secured in place as concrete placing advanced. Ordinarily a crew of 18 men, including the carpenter and concrete foremen, moved and set two sets of forms and placed and finished two sections of concrete in two days. Commercial preparations were used for curing.

Hoops supporting the dome horizontal thrust were



Great Falls tank during construction.

first prestressed to 12,000 lbs. psi. The dome concrete, averaging 4" in thickness, was placed in horizontal zones. When this concrete was nine days old the hoops were prestressed to 32,000 lbs. psi and the forms removed. The dome center settled 3/16". The grooved inside floor and wall joints were filled with expanding mortar, and all the inside surfaces given a thorough spray coat of thick asphalt emulsion.

The wall panels between pilasters are finished in a natural cement gray color and with a slightly rough texture. The pilasters are finished a shade lighter and after receiving a thin brush-coat of fine sand mortar were rubbed smooth with a wood float. The dome is coated with an asphalt base aluminum paint.

The design, the plans and specifications were prepared by Corwin & Co., Inc., consulting engineers and architects, of Great Falls, Montana; M. E. Chamberlin, chief engineer; W. J. Wenzel, associate engineer; C. A. Hunter, chief architect; and C. A. Decker, materials and supervising engineer. W. H. Wick, construction engineer, represented the Federal Works Agency.

### Stream Improvement Week in Indiana

Governor Gates of Indiana has proclaimed the week of August 13th to 20th as "Stream Improvement Week." In his proclamation he says:

"I feel there is a great need for the cleaning up of Indiana's streams, rivers, and lakes, and also for the enlightening and arousing of interest among our citizens of Indiana toward the achievements of this goal.

"Indiana ranks twenty-first in the United States in stream pollution control with only 59.7% of our urban population being served with sewage treatment, and I feel perhaps this bad showing on the part of our State toward protecting these beautiful natural resources which we have inherited, might be due to our failure to appreciate their importance in the economic balance of our State, and might be due to the apathy of all of us.

"The condition of these waterways is usually worse during the hot summer months and the period usually referred to as dog days," wherefore the week designated seems to be an appropriate one.



# Repairing a Sinking Highway Bridge Pier

**Further sinking of the pier prevented, the bridge trusses raised and pier top extended, all without the use of any falsework.**

By B. FITZPATRICK

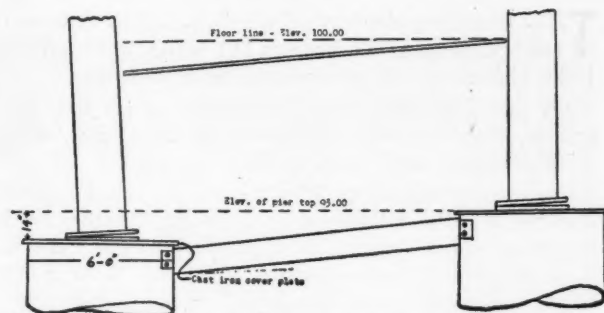
**County Engineer, Colorado County, Texas**

IN DECEMBER, 1943, the Rural Route mail carrier out of Wallace, Texas, reported that the county bridge over the Brazos River was about to go into the river. This report caused some concern to Commissioners Courts of both Austin and Ft. Bend counties, for this was a county line bridge and maintained by both counties. I was called and met the Commissioners at the bridge site, and it was immediately very evident to us that something was very much wrong with the middle pier.

This bridge had formerly carried the S. A. & A. P. Railroad, but when the railroad built a new bridge about 500 ft. up stream the counties bought the old one and converted it into a highway bridge. It consisted of two 200-ft. spans of through trusses, resting on a pier in the center of the river. The pier comprised two steel tubes 7 ft. in diameter, filled with concrete, resting on buckshot gravel and sand, which extended down to a depth of 85 ft. below the bridge floor or 15 ft. below the bed of the river. Under this was sand for an unknown depth. The water at this time was 15 to 20 ft. deep at the pier.

It was found that the up-stream tube of this pier had settled some 14 in. This, of course, caused a twist in both spans, some of the members were loose and some under undue strain, and all traffic across the bridge was discontinued.

Building a new pier was "out" from both the WPB

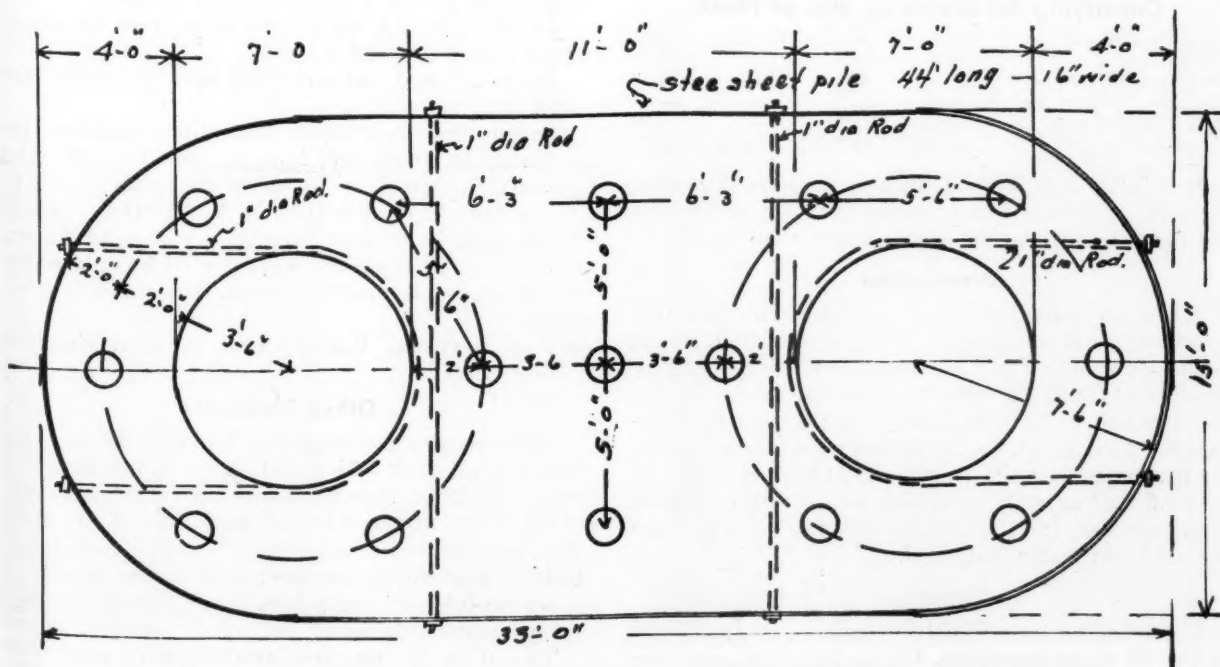


Sketch of top of tubes and bottom of trusses, showing settlement.

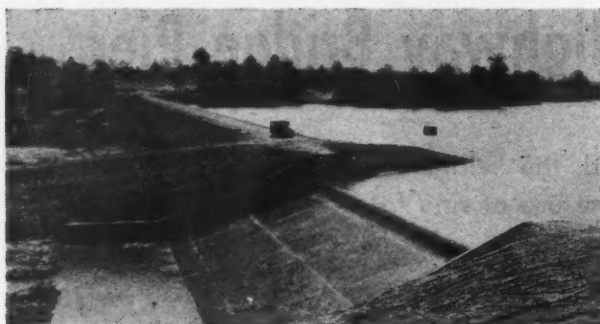
and the financial standpoint, so something had to be done to repair the present pier. This involved two objectives; first, to prevent any further settlement; then, to raise the ends of the trusses to their former position and support them there. After considering several methods, such as building a wood pile pier, all of which had some objectionable features, I devised the plan that was used and is described below.

To prevent further settlement, a coffer dam of steel sheet piling was driven enclosing both tubes and extending 24 ft. below the bed of the river (which prevents any washing out of the sand and gravel under the tubes) and rising 2 ft. above low water

(Continued on page 52)



**Plan of cofferdam around pier. Walls tied together with two transverse rods and a U-rod around each tube.**



Courtesy, Federal Works Agency

**T**HE latest supplement of the U.S.P.H.S. census of water treatment plants lists 151 which were built in 1943, either new plants or revisions of old ones.

Of these, 48 had design capacities of 100,000 gpd or less; 39 of 100,000 to 500,000 gpd; 37 of 500,000 to 2,500,000 gpd, and 27 over 2,500,000 gpd.

These were located in 33 states—4 in New England, 3 in the Middle Atlantic, 8 in the South Atlantic, 4 in the East North Central, 3 in the East South Central, 5 in the West North Central, 2 in the West South Central, 3 in the Mountain and 1 in the Pacific.

#### Source of Supply

Of all the plants reported, 56.3% obtained their supplies from wells, 33.1% from rivers, lakes, impounding reservoirs and other surface sources, 8.6% from springs, two from infiltration galleries and one from mine water. The source varied more with the geographical location than with the size. Wells were the source of supply for all plants in Delaware, Florida, Maryland, Nebraska, Ohio and Wyoming. Surface supplies only were used in Colorado, Connecticut, Idaho, Louisiana, Massachusetts, Michigan, Rhode Island, South Carolina and West Virginia. Wells were sources of 50% to 99% of the supplies in Arkansas, Georgia, Illinois, Indiana, Minnesota, Mississippi, New Jersey, Pennsylvania, South Dakota and Vermont.

#### Classifying the Source by Size of Plant

Capacity of Plant	Surface	Well	Spring	Others
100,000 gpd.	25%	54%	19%	2%
100,000—500,000 gpd.	23%	64%	10%	3%
500,000—2,500,000 gpd.	33%	67%	—	—
Over 2,500,000 gpd.	63%	33%	—	4%
All plants	33.1%	56.3%	8.6%	2.0%

It is seen that wells furnished supplies for more than 60% of the plants of capacities up to 2,500,000, but for only 33% of the plants larger than this.

#### Disinfection

When the data had been tabulated, the fact that stood out most prominently was the almost universal use of chlorine. Of the 151 plants reporting, 142 provided for using chlorine (a few as an emergency measure only); 72 using liquid chlorine and 70 hypochlorite. In general, the latter was used by the smaller plants, the gas by the larger ones. Only one plant of over 2.5 mgd capacity used hypochlorite; 31% of those of 2.5—0.5 mgd; 62% of those of 0.5 to 0.1 mgd; and 8% of those under 0.1 mgd.

#### Filtration

Filtration was provided by 59 plants, located in 24 of the 33 states reporting. Of the 92 plants not providing filtration, 73 obtained supplies from wells, 10

Reservoir built by West Frankfort, Ill. with aid from FWA as a source of additional supply to meet demands of war industries.

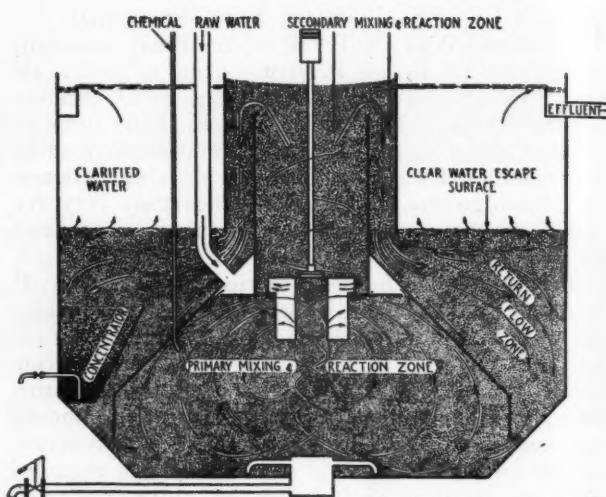


Diagram showing the principle of the "accelerator" for upward-flow sedimentation.

from springs, 2 from infiltration galleries, and only 7 from surface supplies.

Classifying the filtration plants by size, as above, we find in the smallest class 5 rapid sand filters, gravity type; 4 sand filters, pressure type; 1 slow sand filter and 1 roughing filter.

In the 0.1—0.5 mgd class, there were 10 gravity rapid sand filters, 2 pressure and 1 zeolite.

In the 0.5—2.5 mgd class there were 13 gravity rapid sand filters and 1 zeolite.

In the 2.5 mgd and over there were 18 gravity rapid sand filters.

In addition to a rapid sand filter, Holland, Ind. (capacity of plant 0.072 mgd), installed an upflow granular carbon filter for dechlorination.

The filter at Grover Hill, N. Y. (FPHA), capacity 0.393 mgd, is an inlet filter in a trench 60 ft. long, where 6" of 3" stone and 4 ft. of sand was placed over a stone-embedded collector pipe. The water is chlorinated.

Ross Township, Pennsylvania, installed manganese zeolite filters.

#### Other Treatment

**Aeration** was provided by 23 plants. Those of less than 0.1 mgd, of which there were 4, obtained it by means of contact beds filled with coke or other material.

Of plants of the 0.1—0.5 mgd class, 4 used overflow trays or other splashing devices; 3 used contact beds; 3 used spray aerators; 1 device not stated.

Of the 0.5—2.5 mgd class, 2 used overflow trays, 2 spray aerators, 1 contact bed and 1 patented aerator.

Two of the largest class installed spray aerators.

**Chemicals** were used in coagulation by 44 plants;

# Census



# Recent Water Treatment Plants

Sources of supply and methods of disinfection, filtration, aeration, coagulation, sedimentation, and other treatment installed during 1943 at 151 plants in the United States.

alum by 38 of them, lime by 34, soda ash by 6, iron salts by 1.

Activated carbon was used by 13 plants—2 of the smallest size; 1 of the 0.1—0.5 mgd class; 4 of the 0.5—2.5 mgd. class; and 6 of the largest plants.

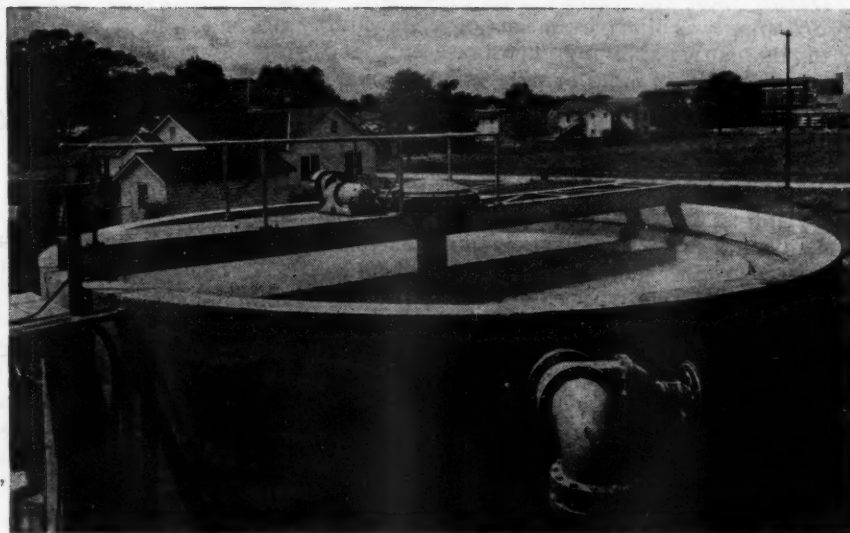
*Sedimentation* tanks were provided in 50 plants. The tanks in 19 of these were open, 4 of the smallest were covered; it was not indicated whether or not the others were covered.

Baffles (other than inlet and outlet) were provided in 4 plants of the smallest class, 3 of the 0.1—0.5 mgd class, 3 of the 0.5—2.5 mgd class, and 4 of the largest plants.

Two plants, one of the smallest class and one of the largest, installed upward-flow cylindrical tanks.

Mechanical sludge removal equipment was reported by one of the largest plants and one of the 0.5—2.5 mgd class. No details were furnished of 19 of the sedimentation tanks.

*Mixing.* Rapid mechanical mixing was provided at 5 of the largest plants and 2 of the 0.5—2.5 mgd class. Mixing by baffles at 5 of the largest class, 2 of the 0.5—2.5 mgd class, 1 of the 0.1—0.5 mgd class and 1 of the smallest class. Slow mechanical mixing by 10 of the largest class, 10 of the 0.1—0.5 class, 1 of the 0.1—0.5 class and 1 of the smallest class.



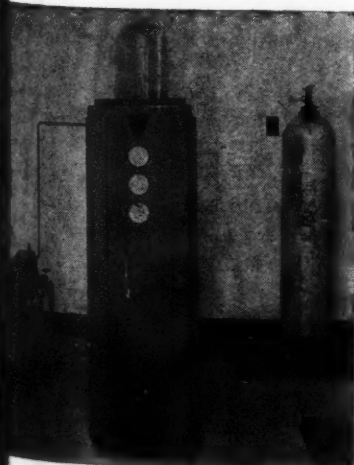
Dorco Hydro-Treator at Jennings, La., for softening 1 mgd.

One of the 0.1—0.5 class and 1 of the 0.5—2.5 class mixed by hydraulic means.

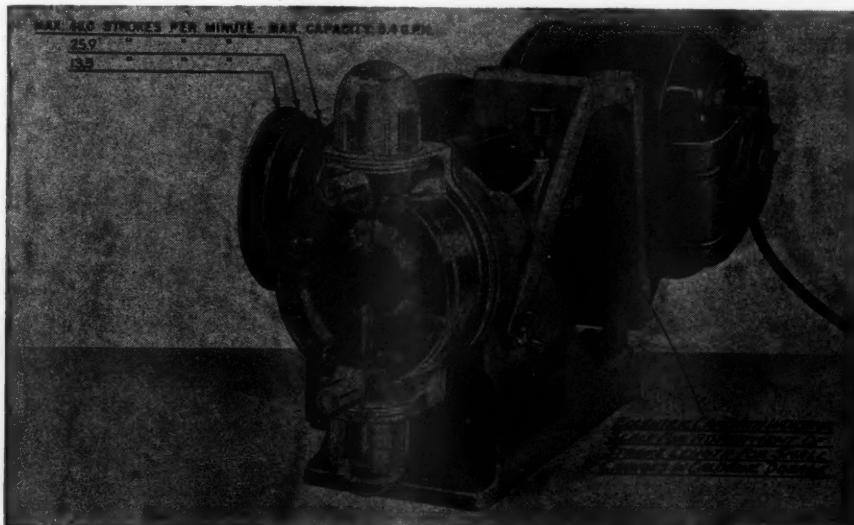
Air agitation was used by 1 of the 0.1—0.5 mgd class.

*Patented sludge blanket* tanks were installed in 2 of the smallest plant, 1 of the 0.5—2.5 class and 2 of the largest class.

*Ammoniation* was provided for by 17 plants—10 of the largest size, 5 of the 0.5—2.5 class, and 2 of the 0.1—0.5 class. Of these, 7 used  $\text{NH}_3$  gas, 1 used ammonium compound, 9 failed to specify the material.



Installation of a W & T automatic visible worm solution feed type ASV chlorinator.



%Proportioners% Midget "Chlorofeeder" hypochlorinator.

*Corrosion correction* or water stabilization was provided, using alkali for pH adjustment in 2 of the smallest class, 4 of the 0.1—0.5 class, 3 of the 0.5—2.5 class and 10 of the largest class. Phosphate compounds were provided for by 1 of the 0.1—0.5 class, 3 of the 0.5—2.5 class and 2 of the largest class.

*Recarbonation* was provided by 2 of the 0.5—2.5 class.

#### **Report of Committee on Water Supply Engineering**

The Committee on Water Supply Engineering of the American Society of Civil Engineers recently reported on conditions in water supply engineering during the years 1943-44. Among the items reported are the following.

During those two years a total of 43 miles of 60" to 36" pipe was lined by means of a traveling, centrifugal, mortar-applying machine with revolving paddles. About 23 miles of pipe 16" and smaller was lined with cement by the Tate process.

The use of gravel-packed wells with brass or bronze or concrete screens, sunk by the rotary or the bailing method, is steadily increasing. These are used where the yield is plentiful, because of less cost per unit and advantage of fewer, larger, and more economically operated turbine pumping units. In some locations where salt-water intrusion occurs, the smaller wells for "skimming" the fresh water are found more desirable. A more economical method of installing water level wells, using drive pipe only  $\frac{1}{4}$  in. or  $\frac{3}{8}$  in. diameter, has been devised and used by engineers of the Soil Conservation Service in California.

*Water Purification.* There has been expansion of the idea of using silica for the improvement of coagulation, and an increasing use of clay is reported as an aid for the coagulation process.

Break-point chlorination is being extended rapidly, resulting in improvement in both quality and taste. The development of the flash test for residual chlorine and the arsenite test for false residual gives very valuable aid in the control of chlorination.

The use of chlorine dioxide is increasing. It is claimed to be particularly effective in destroying phenolic compounds, for which relatively large amounts of activated carbon would be required.

Lime recovery at water softening plants is receiving attention and probably plants will soon not only be producing sufficient lime for the plant but perhaps an excess for sale. Use of the centrifuge for concentrating sludge and improving the quality of the precipitate indicates a future trend in the disposal of softening plant precipitates.

The diatomaceous earth filter is said to have advantages over sand filters in the quality of the water produced and in capacity per unit of weight and of volume, one important advantage being the removal of amoebic cysts.

Considerable progress is being made in the control of corrosion of metals by water. Use of polyphosphates, chromates, glucosides and sodium silicates, as well as the more common alkalis, is being studied; also the application of plastics and other materials as protective coatings.

#### **Boom Truck for Laying Pipe**

The City of East Chicago, Indiana, population about 70,000, has been replacing 6" mains with 12" in the heavy industrial sections. In laying 12" and 16" cast-iron pipe and valves they used heavy trusses that spanned the trench. In order to speed up work

on the project, they purchased a used  $1\frac{1}{2}$ -ton stake-type truck with a power take-off winch, and a 12-foot boom mounted on a 6-inch heavy steel pipe post. The boom was fastened and braced with angle iron straps to the platform of the truck, which was reinforced with heavy plate to stand a heavy strain. The boom could be raised or lowered by a hand crank winch.

They found that the maximum lift on our project was  $1\frac{1}{2}$  tons, a 16" cast-iron pipe, 18 feet long. The boom swings  $270^\circ$ , making it possible to pick up a weight on one side of the truck and swing the boom to the opposite side by hand, pulling on ropes fastened near the end of the boom.

This boom truck was found to be very handy in lowering and raising industrial compound meters from pits, replacing broken fire hydrants and laying water mains. Half the manpower formerly used is needed in performing the above mentioned jobs.

#### **Lowering a 16-Inch Pipe Without Cutting Off Pressure**

Elgin, Illinois, last year lowered a 16" cast-iron main which leads from the pumping station to the center of the distribution system. This was laid 42 years ago with suitable cover, but recently a war industry acquired switching facilities and store yard space which was directly over this pipe line at one point, and grading here reduced the cover to only 1 or 2 feet; and as loaded trucks and cranes weighing 15 to 25 tons would cross or stand on this space, it was thought necessary to lower the pipe so as to give it a cover of 5 to 6 ft. and backfill with sand and gravel.

This section of main was on the high part of a vertical curve, and as lowering it would shorten the length, this was provided for by curving it horizontally.

A trench was dug down to the pipe about 6 ft. wide, and on one side was continued down to the proposed depth, leaving the pipe on a bench. Then the dirt under the pipe was excavated down to this grade at intervals and replaced with wooden blocking, being thus supported at every joint. Then the rest of the dirt bench was removed down to grade.

Three hundred feet of the pipe line was thus uncovered before lowering began, which was started at one end. Three chain-falls were employed, one attached at each 24-foot point over a space of 72 feet. Two men were used for each chain-fall and one man in the trench for removing the blocks. First the pipe was picked up entirely free for 72 feet and the blocking removed. The pipe was then gradually lowered by operating all three chain-falls at the same time until the pipe rested in its new position on the bottom of the trench at the location of the No. 1 chain-fall. The second and third chain-falls were operated so as to keep a gradual slope in the line at all times.

The first chain-fall was then moved to a new location 24 feet ahead of the No. 3 chain-fall, and the work carried on in this progressive manner. A few of the lead joints in the line dripped during lowering, as the spigots would move in the bells in a vertical plane. The lowering required only four hours.

The pressure of 80 lb. was maintained during the entire operation. Several of the lead joints dripped or sweated and probably leaked about a gallon during the operation; at times the outer face of the lead would be as much as  $\frac{1}{2}$  inch beyond the face of the bell. As leakage appeared at a joint, it was recaulked.



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When you need special information—consult the classified READER'S SERVICE DEPT., pages 71-73

## Balancing Strength of Sewage During Sedimentation

(Continued from page 22)

the sewage: from the whole of the sewage 65 per cent of the solid would be removed.

The evidence given in this paper indicates that substantial balancing of strength of sewage during sedimentation occurs for two reasons: (1) On account of the removal of suspended matter. (2) On account of mixing. The results so far obtained show that mixing occurs during primary sedimentation. In tanks of 1-7 hours' capacity at maximum flow a high degree of mixing, or balancing, accompanies settlement.

There is clearly a limit to the extent to which balancing of strength is practicable because of the diffi-

culty in mixing large volumes of water. In Experiment 4 it was seen that a primary tank effluent fairly well balanced in strength did not undergo much additional balancing during secondary sedimentation because the primary effluent was not fluctuating rapidly in strength. A third possible cause of balancing of strength might be the flocculation of suspended matter during sedimentation, but this is regarded as an open question for the time being, and beyond the scope of this paper.

The right conditions could not be obtained during these experiments to make strict comparisons between the balancing of strength in secondary sedimentation tanks operated with and without balancing of flow, but it seems probable that without the balancing of flow which occurred in Experiment 4 the secondary tank effluents would have been just as well balanced

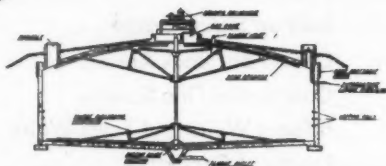
in strength. So that if balancing of flow is to be considered in secondary sedimentation tanks which follow primary tanks of ample capacity, it must be on account of special advantages which a balanced flow confers, and not on account of additional balancing of strength.

Now oxidation plants in this country (but not in the United States) are usually designed to deal at any time with rates of flow equal to three times the dry-weather flow. (This rather vague term is not usually defined. At the Birmingham Drainage Board it is taken to be the average daily flow over a period of at least one week following fourteen dry or almost dry days in summer. If the week-end flow is low it is necessary to avoid including two week-ends in a period of less than fourteen days.) One might therefore argue that balancing of flow during dry weather does not merit consideration, but while it might be desirable to give full treatment in wet weather to the maximum volume possible, an oxidation plant might still give the best results on the average in dry weather when operated under the steadiest load practicable.

When oxidation plants are working at their maximum capacity in wet weather, the opinion is generally held that they do so satisfactorily because the strength of the sewage is reduced in proportion to the increase in volume. However, it is only with prolonged wet weather that this is true, for in the early part of a rainy period the dilution effect of storm water might be quite small.

In rectangular tanks which are desludged periodically the presence of a baffle near the inlet is likely to prevent settlement or even disturb settled sludge. It does not seem easy to make out a case for the use of baffles in rectangular tanks because, apart from the drawback already noted, they rule out the use of mechanical desludging devices, which might increase the efficiency of settlement. For instance, as a result of experience gained with a rectangular, mechanically cleaned

# How's Your DIGESTION?

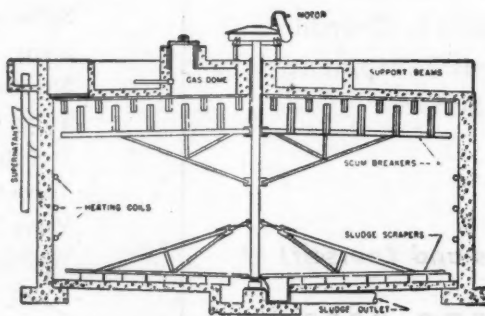


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tank in which effluent was taken off the surface over weirs of unusual length near the tank outlet, Gould<sup>2</sup> has suggested that better results would be obtained by removing effluent from the surface at the inlet end.

The above is an abstract from a paper presented at a meeting of the Institute of Sewage Purification held at Birmingham, England.

<sup>1</sup>Holroyd, A., "The Operation of the Dagenham Pruss Tank," *Journ. Inst. Sew. Purif.*, 1937, Part I, p.p. 62-95.

<sup>2</sup>Gould, R. H., "Final Settling Tanks of Novel Design," *Water Works and Sewerage*, 1943, Vol. 90, p.p. 133-136.

## SODIUM CHLORITE TREATMENT OF WATER

By ALBERT W. READ

Superintendent, Bangor Water Dept.

THE Penobscot river is a variable supply, with wide differences in temperature, color, pH, and tastes and odors at different times of the year. The river has a drainage area of 55,000 square miles and flows from 3,900 c.f.s. to an excess of 100,000 c.f.s. at periods of high water. A population of about 30,000 has direct sewerage connection to the river and its tributaries. Other pollution consists of waste from numerous industries, the bulk of which is sulphate. Algae and organic material gives a color from 30 to 120.

The laboratory experiment on the effect of chlorine dioxide on the water from the Penobscot river was made in September 1944, by John F. Synan of the Mathieson Alkali Works, producers and developers of this process.

It was found that odor and taste could be removed in the laboratory. Twenty-five pounds of sodium chlorite were on hand, enough for thirty hours' run in the

plant. This was used in plant operation in conjunction with the carbon treatment. Within three hours, taste and odor have disappeared at the tap in the laboratory. Later, after a supply of sodium chlorite was obtained, the process was put in operation without the use of carbon. Taste and odors were reduced but not entirely eliminated.

After experimenting, and with the aid of Mr. Synan, it was found that when the amount of sodium chlorite exceeded the amount of chlorine the efficiency of the chlorine dioxide was reduced. By increasing the amount of chlorine to exceed the amount of sodium chlorite, all tastes and odors could be eliminated.

Best results have been obtained by using seven pounds sodium chlorite with eight and a half pounds of chlorine per mg. This produced a water free from odor and taste at the tap in the laboratory. We did, however, continue to get taste from the distribution system in some localities. To correct this, we have tried to carry a chlorine residual of .2 to .8 but there are localities in the distribution system where tastes still persist.

In conclusion:

1. Sodium chlorite will remove taste and odor from the water of the Penobscot river during the most optimum river condition.
2. No true opinion can be given until at least one year of operation had been covered.
3. The period of time required to eliminate the organic matter in the distribution system that causes the tastes is unknown.
4. In our own case, the extra cost of \$2.00 or \$3.00 per mg over the use of carbon is not prohibitive.

—From *Journal*, Maine Water Utilities Assn.

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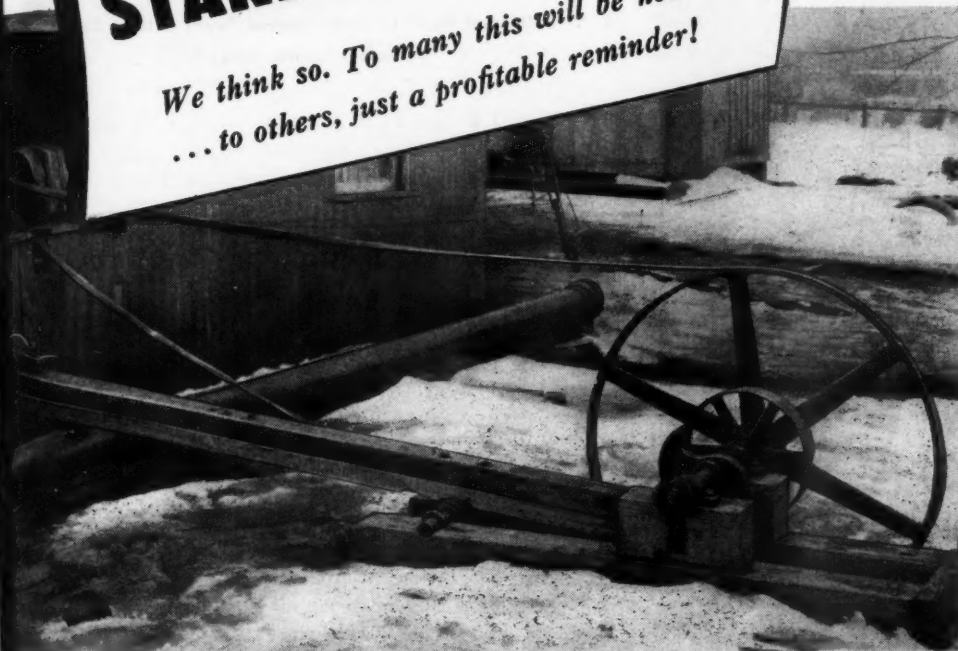
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**T**HIS test was made to see what jointing with Tegul-MINERALEAD could really stand.

As a matter of fact, not one joint in fifty thousand would, in fifteen years of normal service, undergo anything even remotely approaching the punishment imposed in this fifteen hour test.

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- NO SKILLED LABOR or deep bell holes required.

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## Maintaining Water Meters in Corpus Christi, Texas

By R. A. STEELE

General Meter Foreman, Central Power & Light Co.,  
Corpus Christi, Texas

**W**ATER METER maintenance should go further than just repairing and testing meters in the shop. Good practice dictates close field inspection with removal for shop examination and repairs at regular intervals.

As we all know, a water meter has to take more abuse and punishment than any other kind of measuring instrument, and, in general, receives the least care and attention. If water meters keep running and no large difference shows up between meter reading periods, they are frequently forgotten. Probably, if the cost of a cubic foot or gallon of water approximated the cost of a commodity like gasoline, meter negligence would cease. But in the final analysis, water does cost money and the only way to be sure of an equitable return for capital invested in a water works system lies in securing the maximum revenue from every service. Universal metering will accomplish much in this respect, but neglect of meters after they have been set often defeats the purpose.

The majority of utility companies do not neglect their meters. They keep well-trained meter men in the field checking and inspecting their meters continually. Meters on commercial services and those handling large volumes are tested on regular schedule.

We advocate training meter readers to observe all installations, at every reading, for "bad order" domestic and commercial meters. The meter reader is in the "front lines" insofar as the water utility is concerned. Frequently he is the only direct contact between the consumer and the supplier. A well-trained meter reader can do much to improve public relations. He can also perform a real service to his employers by turning in change orders for the replacement of meters that are obviously in poor condition.

All large meters should have the attention of an experienced meterman at least twice a year—more frequently if conditions permit. We try to test large industrial meters every sixty days.

Proper care and attention to the detail of setting large meters will pay dividends to the water works operator or utility in the form of later ease in handling, accessibility, and testing convenience. Metermen should supervise the setting of all large meters. It is not considered good practice to have elbows and similar fittings located too close to a meter. One joint of pipe should be placed ahead of each large meter installation. It is also considered to be good practice to install large meters with test connections, provided none are incorporated in the meter design.

We always, wherever practical, set large meters within a by-pass. There has been some talk by water works men against the use of a by-pass. Their only valid argument is in not closing the by-pass valve completely. We have had very little trouble on this score as we check each valve every time a meter is inspected. We also always keep our by-pass valves sealed. In favor of a by-pass, we can name three ways in which we think it helps and pays.

- (1) Meters can be repaired and tested on the premises without inconvenience to customers.





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## ... ON EVERY FRONT

In each of our war theaters American water engineers travel with front line troops to assure adequate water supplies for our fighting men. These men must guard against contamination, provide palatable drinking water and at the same time defend their equipment against enemy attack.

Here in America it is not necessary for water works officials to protect their raw water supplies with a shot gun, but it is essential to guard against contamination that affects the palatability of their water.

Aqua Nuchar, at home or abroad, is the method of purification, because it works on the adsorptive principle—trapping algae and other aqueous impurities in the many faceted surface of each microscopic particle of carbon.

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- (2) A replacement meter can be installed without interrupting service.
- (3) A by-pass is a good safety factor in case of fire, should the valve in a compound meter become stuck or something become lodged within the meter to restrict the flow.

Another point worth mentioning in conjunction with the installation of large meters is the advisability of having a Dresser, or similar, sleeve type coupling located immediately adjacent to the meter setting. This is a big help when changing meters and especially so when you are replacing one make or type with a meter having a different laying length. Most large meters from various manufacturers do not come in standard lengths.

The general practice of cleaning large meters at

the customers' location is undesirable unless testing facilities were provided when the installation was made. Field testing is good for comparison purposes but doesn't duplicate shop testing results. Test meters used for making field comparisons should always be checked on a prover before and after each location test to make sure of their accuracy.

All meters, large or small, should be brought to the meter shop at least once every five years for repair and test. After completing such work, the consumption of a number of customers who have been billed at minimum rates will increase, due to the repaired meters' ability to record small flow registration.

Meter repair schedules have, of course, suffered during the war. Our own program has been greatly

curtailed since we have been having difficulty in securing and setting new meters for new customers, and, as a consequence, do not have surplus meters for change-outs. In this emergency, we have been only replacing completely stopped meters. However, we are watching our large meters and when we do not have a suitable meter to change with, or a by-pass, then we use a Dutchman, meanwhile rushing the meter to the shop for repairs and tests.

We had a very good plan before the war for increasing the effectiveness of our meters. We would schedule each serviceman to change-out a certain number of meters monthly. The scheduled number depended upon the size of the town where the work was to be done, and started with meters that had seen the longest service.

Also pre-war, we made one experiment where we changed-out a town completely with new meters. I don't know just what our increase in revenue amounted to, but I do know that many of the old meters were low, for the clerks and cashiers in the office had a very busy and unpleasant time explaining the increased bills to customers. This experience shows that it isn't good practice to make complete meter changes at once in a system, as it hurts public relations. However, I am firmly convinced that some practical change-out meter plan should be made and carried out which does not overburden the service and meter departments.

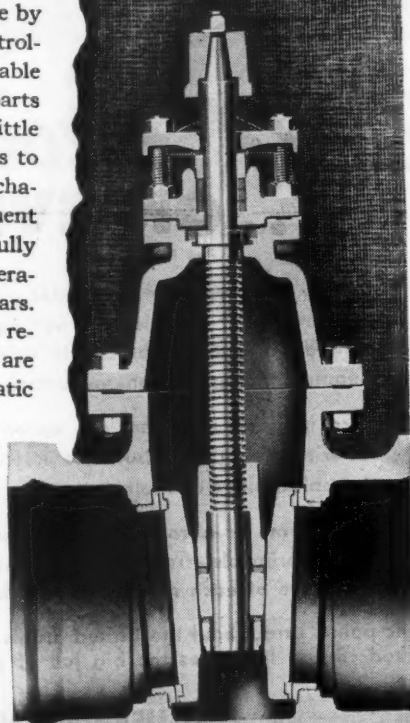
While on the subject of meters, here's something that we have learned to watch when repairing current or propeller type meters. These meters frequently become fast when re-installed in service. The cause has been blamed on impeller blades building up with corrosion or foreign matter, which is true to a certain extent. However, we have found a great many of these meters become fast due to friction being left in the gear train or intermediate gears, and the meter has been calibrated while in this condition. After being in service a short



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(CENTRIFUGALLY CAST IN SAND-MOLDS)

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Cast iron pipe foundries, having broken all pipe production records for war requirements, are now also producing pipe for civilian needs. These foundries, with increased facilities, are all set for V-J Day and the vast tonnage of cast iron pipe which will shortly thereafter be required by war-deferred water works construction. Meanwhile, pipe is obtainable in growing volume without detriment to war orders and is becoming increasingly available, month by month. Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago 3, Illinois.



## CAST IRON PIPE

SERVES FOR CENTURIES

time, this friction works out and the meter runs fast. We had one case where a meter ran as much as 18% fast after a six-month period in service, due to this particular cause.

We all use about the same methods for repairing and testing meters. Some may have better facilities and more modern equipment than others. I personally think that we could all improve on our procedures if the municipalities and utility companies would give their meter superintendents more encouragement and funds with which to work. Proven results from other operating companies show that an intelligent, accurate, and consistent program of meter maintenance has materially increased total gross revenues.

For the above article we are indebted to the *Pittsburgh-Empire Water Journal*.

### Chinese Engineers to Study Highway Methods in the United States

Twenty-six Chinese engineers who expect to have an active part in the future development of China's highways will spend several months working in various State highway departments, gaining practical experience in highway and bridge design, construction, maintenance, equipment and material-testing methods used by highway engineers in this country.

They are part of a group of over 700 Chinese who arrived in the United States recently to devote a year to the study of communications, engineering, industrial and agricultural problems. They were brought to

this country under the auspices of the Foreign Economic Administration, with the co-operation of the International Training Administration, Inc., and the Chinese Supply Commission. While in the United States they will receive subsistence pay under lend-lease provisions.

An additional group of 500 or more Chinese trainees are expected to arrive in the near future, making this the largest international training program of its kind in world history.

After a short orientation course at Georgetown University in Washington, the trainees are assigned to Federal and State agencies and private industrial organizations for actual work in their particular fields of study.

The 26 Chinese studying highway matters are college or university graduates who have degrees in civil engineering. Four members of the group have been assigned to the State highway department in California, five to Washington State, three to Oregon, two to Wyoming, two to Texas, one to Ohio, four to Pennsylvania, two to Maryland, one to North Carolina, one to South Carolina and one to the materials-testing laboratory of the Public Roads Administration of the Federal Works Agency in Washington.

Later in the year they will be transferred to other States in order to give them experience in several types of road construction and design in different sections of the country.

Arrangements for the Chinese engineers to work with State highway departments were made by the Public Roads Administration at the request of the International Training Administration.

## IT'S DOWNHILL WORK WITH A WARCO

Around The Earth  
WARCO is Best!



You may not always have the tug of gravity in your favor, actually, but when you have the right combination of design, construction and control which the WARCO engineers have been building into their graders for years - it seems more like a "downhill" job.

Ever examine the key features of a WARCO grader?

- FULL HYDRAULIC POWER CONTROL
- SINGLE MEMBER FRAME (electrically welded)
- ENGINE OVER AXLE POWER UNIT
- REVERSIBLE BLADE
- UP TO 90° MOLDBOARD ANGLE FOR BANKSLOPING
- TANDEM DRIVE (chain driven)

These and many other features will sell you too, on a WARCO! It's a member of a famous family.



**W.A. RIDDELL CORP.**  
BUCYRUS, OHIO, U. S. A.



## "Hey, Mister! What happened?"

The answer too often is the same, once you get a few miles back from main highways.

You hit a hole, blow a tire, break an axle . . . or worse: Ask any farmer. He'll tell you how rough, dangerous roads cost him money . . . disrupt the nation's food distribution system.

America's network of farm-to-market highways needs attention—and needs it badly. Less than 50 per cent of them have any surfacing whatever. And the cost of improving these roads is relatively low. With Barrett Tarvia, often as many as 40 miles of secondary roads can be re-built for what it costs to build one mile of super-highway.

\* \* \*

*Why not consult with the Tarvia field man? He can be a real help on your current and post-war road problems.*



The above is quoted from a Barrett Tarvia advertisement in The Saturday Evening Post.

### THE BARRETT DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N. Y.

New York • Chicago • Birmingham • St. Louis • Detroit  
Philadelphia • Boston • Providence • Rochester • Minneapolis  
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Norwich, Conn. • Savannah, Ga. • Norfolk, Va. In Canada: THE  
BARRETT COMPANY, LTD., Montreal, Toronto, Winnipeg, Vancouver.

**Barrett**  
**Tarvia**  
Reg. U. S. Pat. Off.

## Bituminous Treated Surfaces in California

During the year 1944, California highways improved with State funds were practically all surfaced with bituminous blankets applied to existing pavements which had deteriorated due to heavy traffic during the war emergency. A total of 439.4 miles of such repair surfacing was done—about 3.4 per cent of the entire rural State highway system.

All of the asphaltic concrete was laid with the type of spreader machine that operates without the use of side forms. The operation of laying the pavement was broken up into as many courses as was commensurate

with the maximum size of aggregate being used. This procedure was followed in order to obtain as much benefit as possible from the repeated leveling action of the machine with each spreading operation.

The grade of asphalt most commonly used was the 85-100 penetration. Plans were made for the use of considerable 60-70 penetration asphalt in the 1945 program.

The plant-mixed method of construction was used on 71 per cent of the bituminous treated mileage laid in 1944 and 95 per cent of this surfacing was laid with spreading machines.

A considerable mileage of open graded mixture was laid in 1944. The leveling courses under these surfaces were both dense graded and open graded; the dense graded being used over foundations that were permeable and in which the infiltration of water could cause failure. Open graded surfaces and leveling courses consist of crushed stone with practically all of the fines below the No. 16 sieve removed. The maximum size of aggregate in the leveling course does not generally exceed  $\frac{3}{4}$  inch, and in the surface course it does not exceed  $\frac{3}{8}$  inch. To this aggregate is added paving asphalt ranging from 150 to 300 penetration in amount practically the same as is used in dense graded mixtures. The film thickness of the asphalt cover on the aggregate of open graded mixes is considerably greater than that of dense graded, and, in order to maintain this heavy coverage it is necessary to hold the plant temperature to a range of 180 to 200 degrees for the 200 to 300 penetration asphalt, and 225 to 260 degrees for the 150 to 200 penetration.

The elimination of fines in the open graded type results in a mixture that is practically free from the difficulties usually encountered when water is trapped in dense graded surfacing during construction.

The open graded surface generally has better riding qualities than the dense graded surfacing since the spreading machines seem to work more efficiently with this type of mix. The surface texture of an open graded mix is ideal for uniformity; however, it is highly permeable and is not suitable where waterproofing of the road foundation is essential. The cost of the open graded mixture is greater than the dense grading, due to the elimination of the finer sizes which are usually of natural, unprocessed material. It is believed that the saving in maintenance costs, in a great many areas where native fines are not too favorable, will more than offset the increased initial cost.

**Road-Mix**—The road-mixed method of construction was used on about 23 per cent of the bituminous treated mileage laid in 1944. Of this mileage,



As a B-24 Liberator lands at its base in the Marianas, a Buffalo-Springfield tandem roller smooths and compacts another black top airstrip.

# ... untold miles of *Runways*

... rolled by Buffalo-Springfield tandem rollers  
... serving the Armed Forces all over the world!



**3 Wheel Rollers — 6 to 12 tons**  
**Tandem Rollers — 3 to 17 tons**  
**3-Axle Tandems — 9 to 17 tons**  
**Trench Rollers**

**Write for Data**



## BUFFALO-SPRINGFIELD

**The Buffalo-Springfield Roller Co.**  
**Springfield, Ohio**

**The Oldest and Largest Builder of Road Rolling Equipment in America**

When writing, we will appreciate your mentioning PUBLIC WORKS





# GENERAL'S LIFETIME BATTING AVERAGE .980

18 Years in the Construction  
and Excavating Leagues

*That's* a Record to Think About  
when Choosing New Equipment!

That's right—98 out of 100! The records show that of all the General machines ever built, 98% are still in active service every day! And the other 2% includes General machines on which we no longer have records; some of these units are undoubtedly still in operation. Owners of General Supercranes and Excavators know

how these rugged machines give unfailing service, day after day, even on the toughest jobs. If you are planning the purchase of new equipment, you'll want to learn the facts about General equipment for yourself. You'll be interested in learning how every General machine is designed and built to withstand punishing service for years . . . and you'll be especially interested in the new and revolutionary

## General Type 10, Model 105

. . . a combination crane-shovel-dragline-backhoe and piledriver, all rolled into one—and rolling on rubber. One-man controlled, one-engine powered, it's the most versatile rig you ever put to work! Write today for complete details! The General Excavator Co., Marion, O.



WHAT'S YOUR BATTING AVERAGE ON WAR BOND PURCHASES?

General Excavator five years ago pioneered the industry with the one man operated, one engine powered, rubber-tired SUPER-CRANE (see photo left) . . . the General-built line includes power shovels from 1/2 to 3/4 yard capacity, convertible with all attachments; crawler or wheel-mounted; Diesel, gas or electric power.



When you need special information—consult the classified READER'S SERVICE DEPT., pages 71-73

## Streamlined INSIDE for Higher Efficiency and Lower Operating Costs

**RUGGED SIMPLICITY OF  
DESIGN ELIMINATES  
RECIRCULATION —**

**NEVER LOSES PRIME  
REQUIRES LITTLE  
ATTENTION**

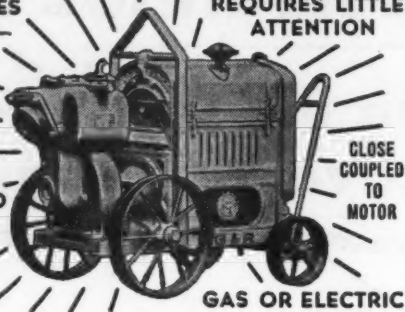
**DELIVERS  
GREATER VOLUME  
PER GAL. OF GAS**

**NO ORIFICE OR  
PRIMING VALVES TO  
CLOG OR JAM**

**CAPACITIES UP TO  
125,000 GPH**

**CLOSE  
COUPLED  
TO MOTOR**

**GAS OR ELECTRIC**



Streamlined where it counts, you can't clog a Gorman-Rupp Self-Priming Pump. Unequaled in rugged efficiency, gallonage or continuous hours. A size and type for every need.



THE GORMAN-RUPP COMPANY, MANSFIELD, O

**GORMAN-RUPP**  
SELF-PRIMING CENTRIFUGAL PUMPS

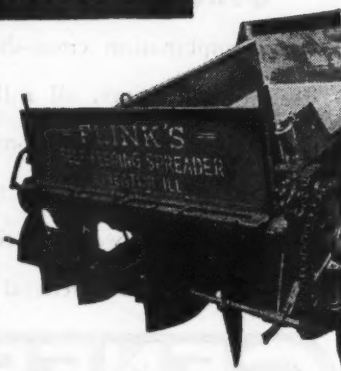
## HOW 1 FLINK DOES WORK OF 3 TRUCKS IN ICE CONTROL

**Spreads  
at 12  
to 20  
miles  
per hour**

In a large midwestern city (names of officials on request), 5 men driving Flink equipped dump trucks replaced 15 trucks and 30 men, controlling as many miles of streets in less time. The answer was the speed and self-feeding ability of Flink spreaders. See below.

Faster. Icy streets and dangerous intersections are brought under control many valuable minutes faster with fewer men, because Flink WD3 spreaders, equipped with the Flink clutch control, can be operated at 12 to 20 miles per hour without stopping truck. Driver speeds rapidly towards danger area, throws spreader into action as he reaches it, and out of action as he finishes treating the icy spot . . . then proceeds at higher speed to next spreading area. Entire operation controlled from cab.

Self-feeding. Raising the dump truck causes material to fall against the spreader. Positive agitators force it through adjustable gates to mixing fans, scientifically placed and angled to deposit an even layer of material, thick or thin, as desired. Spreads full or half width



of street. Throws material down low, not on passing or parked cars.

Spreads all granular materials, wet or dry, up to 1", forward or backward. No clogging or bridging.

Flink Spreaders are ideal for ice control, street and highway maintenance and for spreading agricultural limestone. Does not limit use of truck. Write for complete literature.

**The FLINK COMPANY**

506 VERMILION

STREATOR, ILLINOIS

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only about 8 per cent was mixed with blade graders, the bulk of work being constructed with mixing machines. Some of these mixers were set up at the source of material and used much as a mixing plant, except that the aggregate was not put through a dryer.

**Armor Coat**—The principal objection to armor coat surfacing is that the present method of construction requires ideal weather conditions. Should the weather become unfavorable during construction, full penetration of the dense course of screenings becomes impossible, and subsequent failures appear in the finished surface.

A method of procedure was worked out by construction personnel in District I, on a nine-mile project in Humboldt County between Trinidad and Little Red Hen, in which multiple courses were successfully constructed. This insures full penetration at air temperatures impossible under former methods, and has resulted in a smoother riding pavement.

Excerpt from report in *California Highways and Public Works*.

### Interstate Highway System to Be Mapped

A 40,000-mile system of interstate highways connecting the principal cities in the United States will be mapped this summer for postwar construction.

The most heavily traveled rural highways in the present Federal-Aid system and main thoroughfares in urban areas will be included in the interstate system.

State highway departments have been asked to cooperate with county and other local highway officials and the Public Roads Administration in the selection of a system of secondary roads to be developed after the war, and to define the boundaries of urban areas around cities having a population of 5,000 or more.

The proposed national interstate highway system will provide express routes between all cities having a population of 300,000 or over, all but two or three cities in the 100,000 to 300,000 population group, and numerous smaller cities and towns.

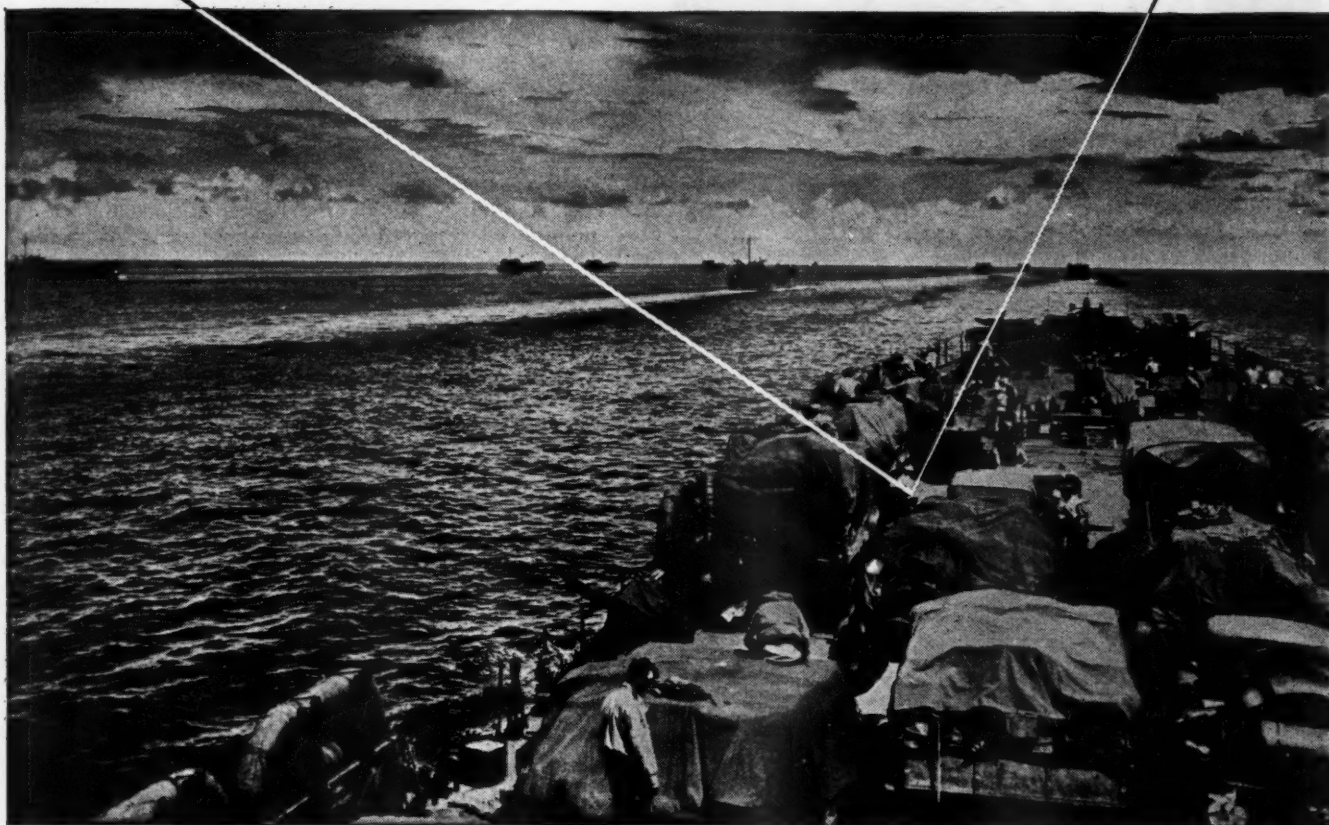
A few highways built prior to the war, notably in Connecticut and New York, approach the standards of design and construction recommended for the national interstate highway system, but it will be necessary to reconstruct most of the highways selected for the system in order to bring them up to required standards, Public Roads Commissioner Thomas H. MacDonald says.

The most dramatic changes in highway design in postwar years will be made in urban areas. Many large cities, with the cooperation of State highway departments and the Public Roads Administration, are developing plans for highway projects that will revolutionize transportation facilities. Traffic bottlenecks will be replaced by broad arterial routes. Expressways will carry traffic from outlying sections of large cities to the downtown business district in less time than it now takes the average motorist, moving at a funeral pace, to traverse five city blocks. Viaducts across depressed expressways will facilitate the movement of traffic on cross-streets. Circumferential parkways on the outskirts of cities will enable drivers to by-pass the downtown section.

The postwar highway program will give the farmer better roads for the transportation of his "cash crops" to market; it will speed up the flow of traffic in urban areas, and will create for the American motorist in the next five to ten years a network of expressways linking all large cities throughout the country.



*On their Way again to Win again!*



## Are You?

Today the veterans of our European victories are sailing to final triumph in the Pacific! Meanwhile patriotic American industrial leaders are following a full-speed-ahead program to hasten peace through the Payroll Savings Plan!

From coast to coast, veteran Bond salesmen—and women—who put over the Mighty 7th, are once more mustered into service for plantwide selective re-

solicitation campaigns. These special efforts to keep employee Bond buying at a maximum are directed toward two major objectives:

**A** To hold every new 7th War Loan subscriber on the Payroll Savings Plan books—maintaining and, wherever possible, increasing present Bond allotments.

**B** To convince all regular sub-

scribers who recently stepped up their Bond buying, of the many advantages of continuing on this foresighted, extra-Bonds-for-the-future basis.

Back up our fighting men who have won one war—and will win another. Use selective resolicitation to make your Payroll Savings Plan more effective—put a tighter rein on inflationary tendencies—build peacetime prosperity.

*The Treasury Department acknowledges with appreciation the publication of this message by*

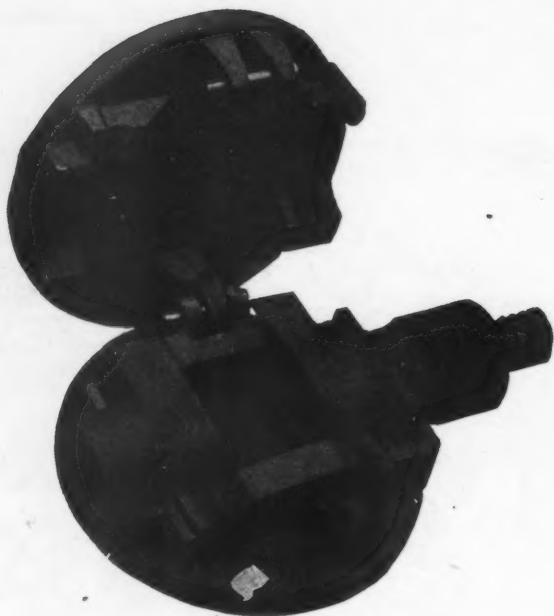
## PUBLIC WORKS Magazine

★

*This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and War Advertising Council*

*When you need special information—consult the classified READER'S SERVICE DEPT., pages 71-73*

*Know what  
this is?*



It's the inside wedging mechanism of a Mueller-Columbian Gate Valve, opened out to show its construction. It shows how the side spreaders (being free to adjust themselves) act as equalizers between the top and bottom wedges and applies the force equally to four points near the OUTER EDGE of the discs instead of in the center with the obvious tendency to spring the discs and cause a sticking and leaky valve.

This is an exclusive feature found only in Mueller-Columbian Valves. It is used in all Mueller Gate Valves and is one very good reason why Mueller-Columbian Gate Valves have a reputation among water works men for dependable service and extremely low maintenance cost. Write us for complete information.

**MUELLER CO.**  
CHATTANOOGA, TENN.

When writing, we will appreciate your mentioning PUBLIC WORKS

## Solving a Water Shortage Involved Legal Difficulties

By FRANK J. THIERY

Superintendent, Bristol Water Department, Bristol, Connecticut

**B**RISTOL, CONN., an industrial city with a normal population before the war of 30,000, grew rapidly so that early in 1943 the population was estimated at 40,000. This increased population, together with the driest six months on record for this locality, found the Water Department with an acute water shortage. We increased our underground supply by about 200,000 gallons daily. We also set up an emergency pumping station on a brook which was somewhat polluted, the water needing considerable treatment before entering our distribution reservoir. All in all, we were able to increase our yield about 900,000 gallons daily—just enough to take us through the dry period to safety.

However, this supply was only temporary and was very costly. It was still necessary for the Department to seek more storage, and we secured an option on a pond that had been used for power purposes, which had a storage capacity of 162,000,000 gallons and a 2½ sq. mi. watershed, sparsely settled. But our city charter did not allow us to acquire water rights in other than the Poland Brook shed, so we were faced with getting the charter changed. The General Assembly in the State of Connecticut meets every other year, and this was the off year; but the Governor, utilizing his special war powers, called an emergency session which passed a bill giving the Department the authority to acquire the water and watershed needed, so the purchase of the pond was then completed.

To connect the newly acquired pond to our distribution reservoir necessitated laying 4,600 feet of 16" pipe and we made application to the War Production Board for the necessary priorities for this length of cement-lined cast-iron pipe. Meantime we secured the right-of-way over 4,600 feet of open country, owned by six individual property owners. No particular width on the right-of-way was stated but we were to be allowed to excavate, lay and maintain a 16" line. This indefinite limit turned out to be rather helpful during the actual laying, as the going was about as bad as anyone could imagine. We had to excavate over 300 cubic yards of rock, as well as some very wet, sandy clay that necessitated shoring the ditch for a distance of approximately 500 feet. We used two ¾-yard Bay City back hoes to make the excavation. The backfilling was done with bulldozers. After forty days of actual working time, the line was completed and we were ready to use the water in time to take care of the dry spell of 1944.

During the laying of the pipe line, an inspection was made of the proposed new supply by the State Department of Health. Everything was in order except for a cemetery. This is no longer in use and is entirely off the watershed, but there is a state law that no cemetery be allowed within one-half mile of a public water supply. So it was necessary to sue the State Board of Health through the Superior Court to have a court order to allow us to use the water. This order was obtained and we now have an ample water supply for the present, with the opportunity to enlarge the basin to care for our needs for some years to come.

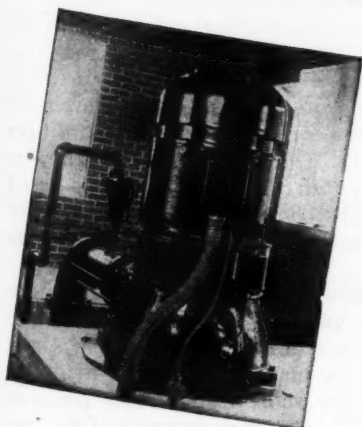
The pipe used on this job was sandspun centrifugal class 150, cement lined, with joints made of Leadite. After a year of continuous operation we have yet to have our first leak.





## TROY, ALABAMA

### Now Has a Layne Automatic Water System



#### LAYNE AFFILIATED COMPANIES

Layne-Arkansas Co., Stuttgart, Ark.  
 ★ Layne-Atlantic Co., Norfolk, Va.  
 ★ Layne-Central Co., Memphis, Tenn.  
 ★ Layne-Northern Co., Mishawaka, Ind.  
 ★ Layne-Louisiana Co., Lake Charles, La.  
 ★ Louisiana Well Co., Monroe, La.  
 ★ Layne-New York Co., New York City and Pittsburgh, Pa.  
 ★ Layne-Northwest Co., Milwaukee, Wis.  
 ★ Layne-Ohio Co., Columbus, Ohio  
 ★ Layne-Texas Co., Houston and Dallas, Texas  
 ★ Layne-Western Co., Kansas City, Mo., Chicago, Ill., and Omaha, Neb.  
 ★ Layne-Western Co., of Minnesota, Minneapolis, Minn.  
 ★ International Water Supply, Ltd., London, Ontario, Canada  
 ★ Layne-Hispano Americana, S. A., Mexico, D. F.

City Officials of Troy, Alabama are in high spirits these days. Where all others have failed, Layne has just completed a water system **WITHIN THE CITY LIMITS** that produces over 1,000,000 gallons daily. Furthermore this new system is equipped with the latest automatic control device which eliminates manual starting and stopping.

Prior to the completion of this new Layne System, all water for the city of Troy was obtained from wells located some three miles away. The success achieved by Layne will now enable the city to install other wells and thus abandon the distantly located and expensive to operate system.

Here again is proof that Layne's experience, knowledge and specialization always pays handsome dividends. Building this well was no easy

task. It was drilled through rock strata from one to sixteen feet in thickness. Some five-hundred bags of cement were used to seal off all but the desired water bearing sand formations.

Layne is now almost entirely engaged in civilian Well Water System building—and is ready to serve you. Write, wire or phone for further facts, catalogs. **LAYNE & BOWLER, INC.**, General Offices, Memphis 8, Tenn.



## WELL WATER SYSTEMS VERTICAL TURBINE PUMPS

When you need special information—consult the classified READER'S SERVICE DEPT., pages 71-73



# LE ROI ENGINES

back up your good judgment  
with dependable,  
*Low-cost Power*

When you specify "Le Roi" power, your recommendation is backed by a manufacturer who has concentrated exclusively on the problems of the heavy-duty engine field for more than a quarter century.

Le Roi engines have established a reputation for operating dependability and economy—from driving deep well pumps to supplying reliable power for generators.

These engines are available in 2 to 12 cylinders rating from 4 to 400 H.P. You can use gasoline, natural gas, butane, or sewage gas.

*Write for informative bulletins.*



**Le Roi Company**

1770 S. 68th Street

Milwaukee 14, Wisconsin

**ENGINES • ENGINE-GENERATORS  
PORTABLE AIR COMPRESSORS**

When writing, we will appreciate your mentioning PUBLIC WORKS

## The Two-Main System in Ireland

A paper before the Institution of Civil Engineers of Ireland by C. H. Clifton and L. Kavanagh describes the practice of water distribution of the city of Dublin and includes the following discussion of the two-main system:

The old system for service mains was to lay the pipe in the center of the roadway, and to take the lead house services from this point to the houses. Hydrant branches were laid from the main to the footpath. This method has been abandoned almost entirely in favor of mains laid in each footpath. If a trunk main is required through an area, it is laid in one footpath and all house services on that side are taken from it. A smaller service main is laid on the opposite footpath, to supply the houses on that side. Ordinarily, a 4-in. service pipe is laid in one footpath and a 6-in. pipe in the opposite.

At first glance, this may appear an expensive practice, but on closer examination it can be shown to be economically sound, particularly in the case of city work.

Where mains are laid in city thoroughfares the cost is governed to a large extent by the type of surface which must be broken and repaired. The cost of laying one 4-in. main in the center of a carriageway, surfaced with sett paving would be 34s. 1d. per lin. yd. To this must be added the cost of the lead house services which amounts to 19s. 3d. per lin. yd. of main. The overall cost per lin. yd. of street is, therefore, 53s. 4d. On the same basis it has been calculated that the corresponding cost per lin. yd. of street where double mains are laid is 46s. 11d. This latter price represents an initial saving of 6s. 5d. per lin. yd. of street. In addition, the considerable reduction in future maintenance costs of lead services must be taken into account.

Where double mains are laid in newly developed areas the initial cost is approximately 28% more than the cost of single mains. The builders are required to contribute towards this cost. This contribution is based on the saving effected by the reduction in the lengths of the lead service pipes, the provision of which is the builders' liability.

Due consideration, however, must be given to future maintenance of mains and services. The maintenance cost of two mains in concrete footpaths would be somewhat less than that of one main in a concrete roadway. Maintenance costs of the short lead service pipes in concrete footpaths would be a small fraction of the cost of maintaining the same pipe if laid under a concrete roadway, and the need for making openings in modern high-class and expensive road surfaces for the purpose of repair work is obviated.

There is less interruption to the supply of water to consumers where there are mains on both sides of a street. Where one main only is laid in the center of the carriageway, hydrant branches must be laid to the footpath, thereby providing dead ends for stagnant water.

## Restoring Water and Sewerage Service in a Philippine City

Some city engineers and waterworks superintendents who have experienced difficulties in maintaining their water and sewerage systems under wartime conditions in the United States may be interested to read the following abstract from a letter written by a Sanitary Corps officer in the Philippines to the Sanitary Engineering Division of the Surgeon General's Office and published in the Bulletin of the U. S. Army Medical Department.



# FROM THE MUDHOLES OF THE SOLOMONS

## TO THE BLEAK ALEUTIANS—



Signal Corps Photo



Official U. S. Navy Photo

**PRICELESS  
PURE DRINKING WATER  
ASSURED  
OUR TROOPS THROUGH**

# HOODCHLOR

*High Test Hypochlorite*

THE GUNGA DIN OF THE U. S. A.

**H**ERE at home, too, more and more municipal and private water-works are using HOODCHLOR to insure potable water that is pure and pleasant to taste.

HOODCHLOR is also extensively used in sewage treatment and for sterilizing swimming pools. Many municipalities keep a supply on hand for emergency use when fires, explosions,

floods, or other disasters disrupt the regular supply.

**HOODCHLOR**, a white granular material, contains over 70% available chlorine, in stable free-flowing form. Now shipped in 25 lb. resealable steel pails. Also in 3 3/4 lb. and 5 lb. cans and 100 lb. drums.

Send for descriptive folder and price list

# HOOD



## CHEMICAL CO., Inc.

EXECUTIVE OFFICES

1819 BROADWAY, NEW YORK 23, N. Y.

FACTORY: AKRON, OHIO

**HOODCHLOR HIGH TEST CALCIUM HYPOCHLORITE · HOOD CHLORILITE  
CAUSTIC SODA · BICARBONATE OF SODA · SODA ASH · CHLORIDE OF LIME**

"I'm now in charge of the city water and sewage system and am chief of the Water Supply Section of Operations Division of Luzon Engineer District. I'm very happy in the work. The amount of work to be done on repair of water distributing system is terrific. Even though there aren't many direct hits on the mains, the tremendous amount of shelling on nearby buildings has been enough to make for a generally leaky system. We now have nearly the whole north side in service, but in some places the pressure is weak. We have maintained 40 to 45 lb. downtown for the last two days. We have few sections in service on south side but there must be 80 per cent of the area burned and all of the big buildings demolished by mines and shellfire. Have over 500 former employees back in Metropolitan Water District Office and, except for repair of 72-inch concrete aqueduct, they are making all repairs. Yesterday ninety-seven leaks were repaired. We're handicapped by lack of trucks and repair materials—not a single repair for broken hydrants; so we're having to make them, which is a slow process when they have to be turned out on lathe. Japs left little spare parts for anything. The big office and repair shops of the Metropolitan Water District are completely wrecked. Have fairly good supply of all sizes of pipe—no large size valves.

"Filter plant will be operating in about six days. After two years of operating without alum, the filters are very dirty. We've washed the first one five times, and it's still not clean. Also have two engineer water supply companies set up, and they operate distribution points where we can't get city water to the area.

"Sewage system O.K. except for burned motors at two lift stations which we can easily replace. Outfall to sea has been reported broken and have man out on

that today. It's a 72-inch cast iron line laid just below bottom. Will look for new diatomaceous filters. I'll never forget these past two months."

### Surfacing Aerodrome Runways in Australia

During the war tar has been extensively used in Australia for wearing or sealing courses on taxi-ways consisting of gravel or other aggregate. The necessity of using local materials and of carrying on construction in all weathers, as well as the shortage of fluxing oils, has led to the development of a technique peculiar to this type of surfacing in Australia.

Before applying the wearing course, the base must be thoroughly compacted and swept clear of dust. A base that is too soft to sweep is too soft for tarring. Priming should be used only if a thoroughly clean surface cannot be obtained, or if the percentage of loam or binder makes it necessary. Decomposed granite gravels should on no account be primed, unless a preliminary test is made, as primer usually acts on them as a lubricant, but good results have been obtained by slightly damping the surface before spraying the tar.

If priming is necessary, crude horizontal retort tars from country gas work will usually give good results. If the wearing surface is to consist of a single surface dressing, it is particularly important to have enough but not too much aggregate. No. 1 coke oven tar, which may be used for this construction, acts partly as a primer, and allows the use of coarse sand as aggregate. When two or three surface dressings are to be applied, the type and quantity of tar will depend on the surface texture required, the type and size of

# Stripe Streets for GREATER SAFETY!



M-B Marker putting down single line at street intersection.



Rear view of M-B hand-propelled Marker equipped for double line striping.

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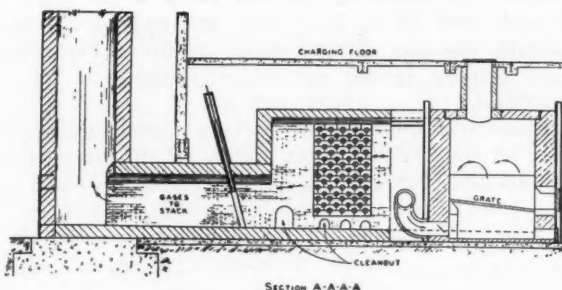
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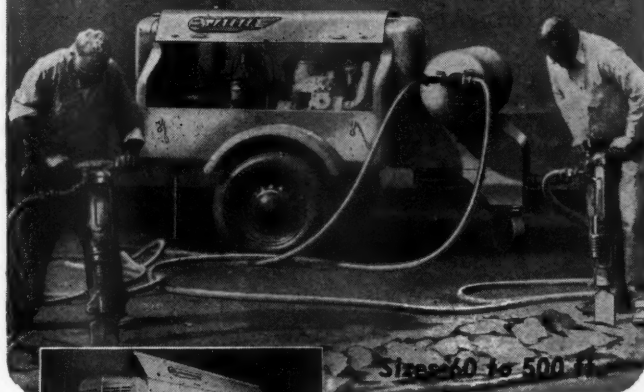
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(BULLETIN NO. 110)

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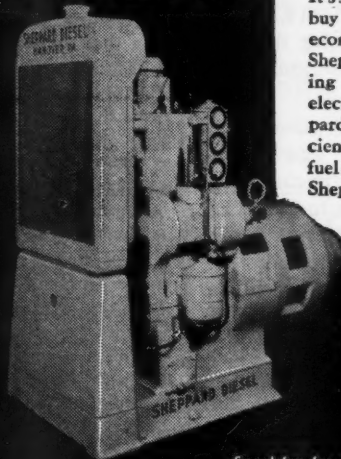
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aggregate available, and the weather conditions. A rougher surface, or a larger size of aggregate, requires more binder, and in any case too much is preferable to too little binder.

As regards aggregates, an excess of gritty fines, such as is found in slags or limestones, is not objectionable. Crushed materials are preferable to round uncrushed gravels; if the latter must be used, the maximum size should not exceed  $\frac{3}{8}$  in., and the tar should be increased by 5 to 10 per cent. The maximum size used with tar should be slightly less than what would be used with the same percentage of asphalt. The aggregate should be well graded down to fines. To obtain a satisfactory result with this type of surfacing, extensive and concentrated rolling is essential, preferably with rubber-tired rollers. The use of

the broom-drag on the final surface is not recommended.

### Repairing a Sinking Highway Bridge Pier

(Continued from page 27)

level. This coffer dam was filled with concrete, giving a monolithic block of concrete about 20 ft. high, 15 ft. wide and 33 ft. long with semi-cylindrical ends.

With the pier permanently repaired, the trusses were readily jacked up and supported, as will be described.

Plans and specifications were prepared and a contract let for \$12,000. Then the W. P. B. turned down the request for the sheet piles, but we made the rounds of junk yards and contractors and finally obtained sufficient pieces of 16" interlocking piling to make the cofferdam, by electric welding them into piles 44 ft. long.

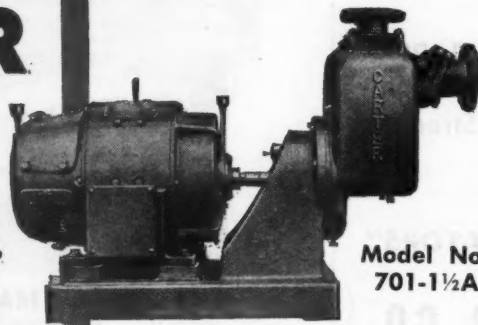
The first steel pile was set and driven about half depth, then all the rest were set, one after another, and driven just enough to stand. With all the piles in place, each was driven 3 or 4 ft., taking them in succession completely around the cofferdam, and this was continued until all had been driven 24 ft.

The job was worked from the bridge floor, saving the expense of false work, etc. A gin pole and boom that turned a complete circle was set up on the bridge between the end posts of the two spans, the floor was taken up in the first panel of each span and the piles lowered through these openings, and a drop hammer used to drive them, the leads hanging from the boom. The driving was not too hard and this method worked O.K. and saved the expense of a lot of false work and pile forms to hold the sheet piles in position for driving.

When the ring of sheet piles had been driven, the tops were tied together with  $1\frac{1}{4}$  in. rods, threaded, with nuts on the outside to keep the piles from spreading when the cofferdam was filled with concrete. This concrete was mixed 1:2:4 and poured by the usual method for placing concrete under water.

To raise the trusses back to the proper level was now the problem. If we had had false work we could have set the jacks under the floor beams, but as we had none and had no other place to set the jacks under the trusses, we had to devise a plan to jack from the pier top. After some deliberation we lit upon this plan: a platform was built around the top of the low tube to work from and two 100-ton hydraulic jacks were set on top of tube and a short, heavy "H" beam was set horizontal, vertically above the shoe pin, one end on the head of the jacks and the other on the bottom flange of the center girder

## CARTER Self Priming CENTRIFUGAL PUMPS



Model No.  
701-1 1/2 A

### SAVE MANHOURS -- SAVE MONEY

Whether it's war or peace, repairing obsolete pumping equipment means dissipating costly man hours. That's money doubly spent when you realize a new unit will deliver more gallonage and give you 100% water insurance with practically no attention.

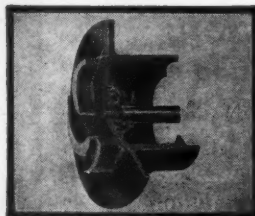
Now's the time "to get set" for those plant improvements you've been thinking about. Whether it's a new installation or a replacement, you'll want the most economical from both the initial and maintenance cost angles. That's where the dependable CARTER unit will prove its merit. That's why thousands of CARTER centrifugal pumps are being used by our armed forces throughout the world.

At home these same pumps cut their eye teeth years ago in the construction field and became nationally famous under the CARTER "Humdinger" trade name. There they proved they could "take it." There they proved that low initial and maintenance cost plus dependability . . . saved man hours and saved money.



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for further information

For sealing the pumped liquid at the rotating shaft, CARTER provides a stuffing box or seal ring type of seal as illustrated. Both methods are easily maintained, effective and trouble free.



Pump design is such that suction connections can be set to either of the two positions illustrated at right, and below. Modifications of this design are available to suit your particular job requirement.



Built-in suction check eliminates necessity of check or foot valve in suction line. Installed between suction manifold and suction fitting, it is guaranteed to hold vacuum between pumping operations. One of many CARTER features.

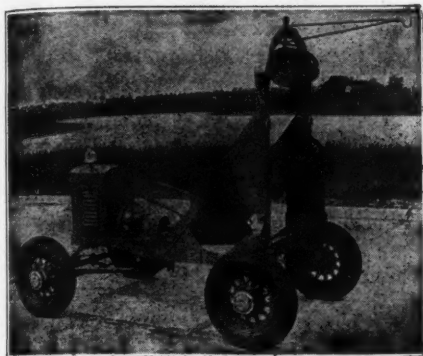


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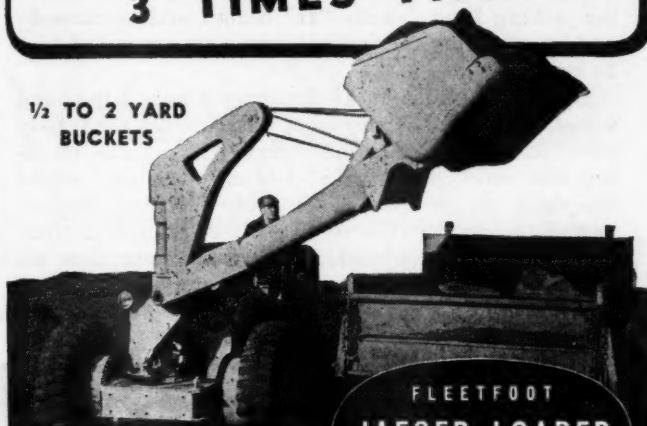
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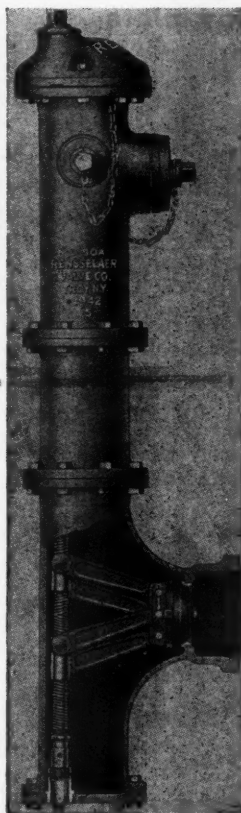
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Use the hydrant which guarantees no flooding due to stand-pipe breakage.

FULL STRENGTH throughout.  
No weakened flange.

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of the bridge. A hole was cut in the cover plate of each end post vertically above the shoe pin and a small cable was then wound with several turns under the pin and over the "H" beam on the jacks. This tied the trusses to the jacking lever (as the "H" beam could be termed) and by operating the jacks the trusses were raised back to level.

By means of the jacks the trusses were lifted and were kept blocked as they were raised. When the trusses were back at the original level, part of the blocking was removed and a 15" I-beam was placed under the shoes of the span. Then more blocking was removed and another I-beam was placed; a total of four 15" beams being placed. The trusses were then set in the beams and a form was built around the top of

the tube and filled with concrete. This completed the job.

There have been some high rises in the river since then but no more sinking has developed.

By handling the job from the bridge deck, only a small amount of equipment was needed. This equipment consisted of a guy derrick and boom made of wood; a Novo 2-drum gasoline hoist; a Chevrolet 1½-ton truck; a Jaeger 2-bag concrete mixer, and two Norton 100-ton jacks, with the necessary blocks and cable and a 2000-lb. drop hammer.

At this time J. Lee Dittert was County Judge of Austin County, and Hunter P. Harris was County Judge of Ft. Bend County.

### Rejuvenating an Overloaded Activated Sludge Plant

Many sanitary engineers engaged in sewage treatment design have been confronted with the problem of re-vamping an overloaded sewage treatment plant of the activated sludge type. In most cases the engineer will add more units of the type in use, introducing any design improvements made available since the original construction. An activated sludge plant equipped with mechanical aerators located at a flying field in this service command (the Sixth Service Command—Wisconsin, Illinois and Michigan) had gradually become overloaded until bulking was the rule rather than the exception and overall B.O.D. removal dropped to approximately 80 per cent. Swing diffusers, available from Treasury Department surpluses, complete with small air compressors and appurtenances presented a ready-made solution. Eight of these diffuser assemblies were mounted on plates hanging off the walkways between the aeration tanks, with the swing arms just clearing the mechanical aerators in the tanks. Good settling activated sludge developed rapidly, bulking stopped, dissolved oxygen appeared in the aeration tanks and B.O.D. removals rose to 93 per cent. This arrangement is flexible in that more units can be installed wherever dissolved oxygen and sludge index studies indicate aeration deficiencies. Thus, units might be installed only in the first two or three aeration tanks. Further details of this method will be available when a current performance study is completed.

This plan provides a low-cost solution to the sewage treatment problem of the small community with mechanical aeration where unpredicted industrial or residential expansion has seriously impaired treatment efficiency.—From a paper "Water Supply and Sewage Disposal in the Sixth Service Command" presented before the Western Society of Engineers by A. J. Steffen, Captain, Corps of Engineers.



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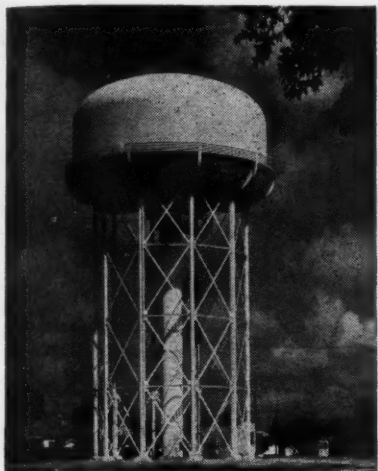
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One million gallon radial cone bottom tank at Beaumont, Texas.

### Booster Pumping By Kittery District

Kittery (Maine) Water District, because it had to supply Government agencies with more than twice the amount of water used for domestic, commercial, etc. purposes, in 1941-42 built a dam increasing the storage at Folly Pond, the source of its supply, by 200,000,000 gal. In 1942, still more water being needed, FWA built for it a pumping station at Chase Pond and two 12" pipe lines to Folly Pond, laid on the surface of the frozen ground. A 1,400 gpm and a 700 gpm pump were installed at Chase Pond and were pumping in service thirty days after the contract was awarded.

In 1943 a spring, two miles from Kittery, was developed to yield 140 gpm.

There now was plenty of water, but the two 12" mains from Folly Pond to Kittery, 8 miles, did not have sufficient capacity with the fall available. To remedy this, a booster station was built  $4\frac{1}{2}$  miles from the reservoir,  $3\frac{1}{2}$  miles from Kittery, where the pressure is increased about 47 lb., permitting the gradient to be increased sufficiently to carry 2,000 gpm instead of the 1,250 gpm carried previously. The booster pump is a centrifugal, driven by a 125 hp motor, with automatic electric controls, starting and stopping the pump by pressure or by time, or a combination of both. When the pump stops, the water flows by gravity as before. In April, 1943, when this paper was written, it was necessary to operate the booster pump only about one-half the time. After the war it probably will not be necessary to operate it at all, unless in an emergency.<sup>V4</sup>

\*See Bibliography in the July Issue.

# The Waterworks Digest

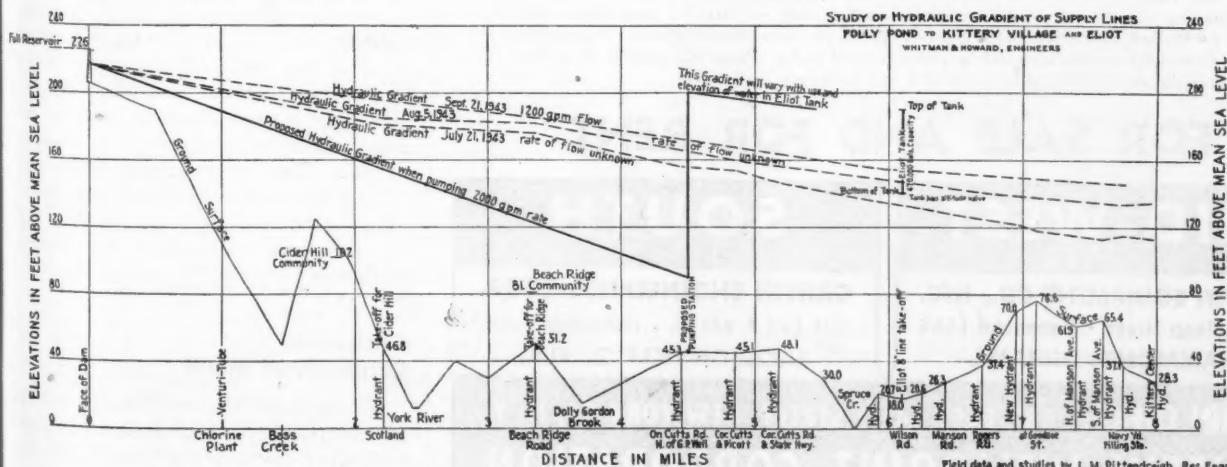
Abstracts of the main features of all important articles dealing with waterworks and water purification that appeared in the previous month's periodicals.

### Water Conservation In Los Angeles County

Los Angeles County Flood Control District maintains 18 dams, 226 miles of improved flood channels, 2,500 check dams and 7 water-spreading grounds adjacent to these channels. The reservoirs are operated primarily for flood regulation during the period of the greatest likelihood of severe storms—December into March. During this period regulated releases often increase contributions to ground water from stream-bed percolation; and off-stream spreading grounds are operated whenever the quantity of water stored and the probable period between storms warrant constructing temporary diversion dams in natural river beds, or operating permanent diversion works in improved channels. After the middle of March, flood control regulating capacity is gradually encroached upon until the middle of April, when all available surplus stream flow is stored. This accumulated storage is used for direct domestic and agricultural supply. Any additional reservoir water is put into underground storage by percolation in channels and spreading grounds. In this manner the cycle is completed and the reservoirs are ready for flood regulation prior to the next storm season.<sup>K7</sup>

### Silver-Copper-Lead Pipe for Services

To conserve metal supplies, there has been used in Great Britain an alloy consisting of lead combined with 0.005 part each of silver and copper. This has 15% more tensile strength than ordinary lead and its resistance to creep is



Study of hydraulic gradient of Kittery supply lines from Folly Pond to Kittery.

many times greater. It costs  $\frac{1}{8}$  more per pound than lead, but because of thinner walls,  $\frac{1}{2}$ " and  $\frac{3}{4}$ " pipe cost only about  $\frac{3}{4}$  as much per foot of length. It is now being marketed under specifications of the British Standards Institution. It can be expanded at the ends, bent or coiled without crack or flaw.<sup>F85\*</sup>

### Meter School In Texas

A course in water meter repair was given in Dallas, Texas, on January 15 to 20, 1945, and another in Austin on April 30 to May 5. At Dallas, classes were conducted 8½ hours daily and two night sessions; at Austin, 8 hours daily plus two evening lecture classes. Each student cleans, repairs and tests many meters under supervision of experienced instructors. A third school was scheduled for

Houston, and later in other large cities. The first school was attended by meter service men from nine municipalities.<sup>F87\*</sup>

### Laying Submarine Pipe in Portland Harbor

Mains of the Portland, Maine, Water District had to be extended to reach war installations on five islands in Portland Harbor, involving laying 24,000 ft. of subaqueous mains, in some places 120 ft. deep, in five installations. Of these 9,600 ft. were 12" wrought iron pipe, the only kind readily obtainable, and practicable for depth of 40 ft. This was welded into 200-ft. sections for laying and a flange welded to each end of each section. Each welded joint was reinforced with a sleeve 18" long covering the joint and with its ends fillet-welded to the pipe.

The pipe was coated with heavy "No-Oxid" grease and wrapped with heavy bituminous-impregnated paper. A plate was bolted to each end of a section and it was floated to place, over a trench that had been dug by clam-shell buckets. Four buoys—mine net floats—were fastened to a section; its rear end was bolted to the forward end of a section already laid, while its forward end was elevated by a derrick on a lighter. The buoys supplied enough lifting power to cause the pipe to maintain a curve of 1,250 feet radius without exceeding the allowable stress in the pipe.

Cast iron was used for a 9,000-ft. section to depths of 120 ft. Then it was possible to obtain 8" and 12" heavy-duty flexible-joint pipe. This was laid in 60 ft. sections with a strong-back, and flanged connections bolted up in the trench by a diver. A 4,500-ft. length was laid using second-hand 3½ in. steel boiler tubing welded into 350 ft. lengths, which were fastened together with Victaulic couplings.<sup>B30</sup>

### Fluctuations Of Ground Water

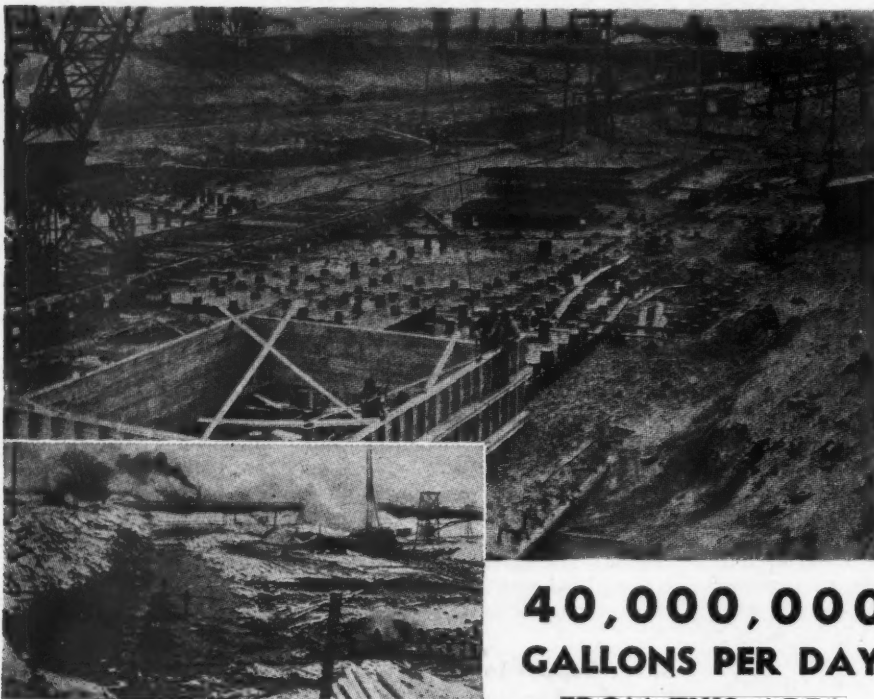
There is a good reason to believe that the reduction of the ground water index to a quantitative measure of the amount of water retained in the water table is the key to many of the uncertainties met in attempting to analyze the operation of the hydrologic cycle. The Pennsylvania Water & Power Co. has found that, by taking into consideration the water stored in the ground, the relation between rainfall and runoff becomes far more definite than shown by the usual scatter diagrams. By determining a more clear-cut relation between those two elements it is possible to make a far better estimate of the rate of loss through evaporation, transpiration, etc., and a study of the behavior of this loss throughout the twelve months of the year.<sup>A83</sup>

### Controlling Corrosion of Metal

Research has disclosed many methods of controlling the corrosion of pipes and other metallic surfaces in contact

(Continued on page 61)

## A Griffin Wellpoint Job!



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**Bibliography of Waterworks Literature**

The articles in each magazine are numbered continuously throughout the year, beginning with our January issue.

c. Indicates construction article; n, note or short article; p, paper before a society (complete or abstract); t, technical article.

**A Journal, American Water Works Ass'n**

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82. The Appropriation of Water for Beneficial Purposes. Pp. 601-631.
83. Interpretation of Natural Fluctuations of Ground Water in Terms of River Flow. By Carroll F. Merriam. Pp. 632-637.
84. Water Treatment at Ottawa, Ontario. By H. P. Stockwell. Pp. 640-643.
85. Boiler Feedwater Treatment. By M. C. Schwartz. Pp. 644-646.
86. Survival and Retirement Experience with Water Works Facilities. Committee Reports. Pp. 647-700.

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11. p. Color and Turbidity of Water. By H. V. Overfield. Pp. 307-309.
12. Recruitment and Training of Water Engineers. Pp. 309-310.

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13. Precipitation Tank Design. Discussion of D8. Pp. 333-336.
14. Breakpoint Chlorination. By E. E. Chandler. Pp. 337-338.

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17. c. Special Steel Forms Speed Concreting at Chicago's Water Filtration Plant. Pp. 76-79.

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18. Economical Sizes of Water Pipe. By C. S. Reagan. P. 119.

**F Water Works Engineering**

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39. Private Water Company Makes College Water Plant Pay. By J. V. Cushing. Pp. 718-720.

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40. Ground Water Code Set Up by Washington State. By W. A. Kunigk. Pp. 776-778.
41. p. Quality of Water in Chicago's Distribution System Extremities. By John R. Baylis. Pp. 785, 796.

**G Water Works and Sewerage**

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24. Problems of a Municipal Water Works Land Owner. By W. R. La Due. Pp. 181-186.
25. Corrosion Control in Potable Water Systems. By Rolf Eliassen. Pp. 187-190.
26. Main Cleaning With Compressed Air. By Roscoe R. Howard. Pp. 192-193.
27. c. Trenching Practice. By Richard Bennett. Pp. 194-197.

**J American City**

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11. A Tough Algae Problem Solved. By James R. Losee. Pp. 75-76, 101.

**K Proceedings, American Soc'y of Civil Engineers**

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7. Correlating Flood Control and Water Supply, Los Angeles Coastal Plain. By Finley B. Laverty. Pp. 831-848.

**L Civil Engineering**

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4. Water for War Plants—A High Priority Product. By Frederick H. Weed. Pp. 303-306.
5. Ohio Conducts State Ground Water Survey. By David H. Harker. Pp. 313-316.

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17. Montreal Water Plan Extension. By F. Y. Dorrance. Pp. 19-22, 42.
18. Cooperative Water Supply Scheme for Three Municipalities. By C. R. Hagey. Pp. 24-26, 62.
19. Cathodic Protection Against Steel Corrosion. By L. P. Sudrabln. Pp. 27-28, 57.
20. Water Supply Standards Improved by Underwriters' Reports. By L. D. Walker. Pp. 29-30, 49.
21. Porous-Plate Underdrains for Rapid Water Filters. By Frank C. Roe. Pp. 19-22.
22. Combining Flocculation, Sludge Thickening and Clarification. Pp. 28-29, 50.
23. Cathodic Protection Against Steel Corrosion. By L. P. Sudrabln. Pp. 46-48.

**P Public Works**

July

31. c. A Difficult 54-Inch Concrete Pipe Line Installation Job. By W. A. Kunigk. Pp. 20-22.
32. Water Supply for a Caribbean Island Base. By D. C. Senges and K. E. Townsend. Pp. 28, 42.
33. Treatment of Water for Ohio Communities. P. 46.
34. Device for Cleaning Suction Screens. By Frank J. Rettig. P. 48.
35. c. Raising Valve Boxes to New Pavement Grades. By William R. Johnson. P. 50.

**V Journal, Maine Water Utilities Ass'n**

July

5. Turbulence and Friction in Water Pipes. By Thomas P. Camp. Pp. 69-78.
6. Sodium Chlorite Treatment at the Filter Plant, Bangor, Me. By Albert W. Read. Pp. 79-80.

**W Johnson National Drillers Journal**

May-June

2. The Treatment of Water. Pp. 1-7, 9-11.



# Flying High!

## AIRCRAFT ENGINES ARE KEPT PURRING WITH CLEAN OIL

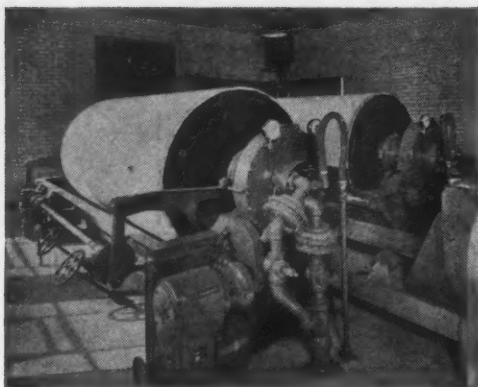
To keep fighters and bombers flying from far-flung bases the world over, the lubricating oil for aircraft engines is kept clean by frequent filtering with portable units powered by gasoline engines. One more of many standard and special applications for Briggs & Stratton 4-cycle air-cooled gasoline engines.

Everywhere they are continuing to establish new performance records — adding to their reputation as the world's finest small air-cooled engines — and forecasting greater utility than ever before on a steadily increasing number of gasoline-powered appliances and equipment.

### Air-Cooled Power



Briggs & Stratton leadership in design, engineering and precision manufacture is the result of a quarter-century of continuous production of "air-cooled power." Manufacturers and users of all types of equipment requiring dependable, compact gasoline power units will find it profitable to call for this experience to help them solve their power problems. BRIGGS & STRATTON CORPORATION Milwaukee 1, Wisconsin, U. S. A.



Vacuum filters at Cuyahoga Falls, Ohio.

### Operating Findlay's Digester

The Findlay, Ohio, primary treatment plant was built in 1932. In 1938 arrangements were made to treat ground garbage with the sewage, to which it is added just behind the screens. Digester gas is used for all heating purposes and to operate a 90 hp gas engine direct-connected to a blower for the activated sludge process, added in 1938.

The digester has a capacity of 560,000 gallons. The center drive shaft is driven by a 5 hp electric motor through a roller chain and sprockets to a safety clutch, with a gear reduction having a secondary worm and wheel of massive proportions. For this, a selective lubricant containing powdered graphite was developed, the thickness of which is changed with the season. Twice a year, graphite mixed with a soft gun grease is applied to each tooth of the worm wheel, using the bare hand, so that any abrasive particle is felt and removed; which requires about two hours.

No difficulty was experienced in starting the digester, which seems to be characteristic of digesters located in the limestone area, where there is sufficient alkalinity in the municipal waters to buffer the normal acid digestion encountered in starting digesters. Lime, when used, should be added in solution; in one tank, where lime had been added in bulk, lumps of it coated with sludge, which seemed to insulate it, were found on the floor of the tank.

In 1938 the supports of the pipes circulating heating water in the digester failed and were replaced with rings around the pipe, into which were screwed  $\frac{1}{2}$  in. hanger rods of Everdur metal, supported from  $\frac{3}{4}$  in. eyebolts screwed into cast-iron inserts in the concrete walls. All points where dissimilar metals adjoined were painted with hot bitumastic sewer jointing compound, and in 1943 no deterioration could be detected in any metal.<sup>H34</sup>

### Sewerage Improvements For Sault Ste. Marie

Improvements to cost \$1,400,000, of which \$1,264,000 is recommended for immediate postwar construction, are proposed for Sault Ste. Marie, Ontario. They include storm sewers, sanitary sewers and interceptors, preliminary treatment of industrial wastes, and a sewage treatment plant including settling tanks, digestion tanks with the gas used for pumping the sewage, the liquid digested sludge to be used on land. The capacity is designed to be 10 cfs of dry weather flow; digestion tank capacity 4 cu. ft. per capita for 30,000 population. Some of the unit costs assumed are: 6" sewers in place, 50c per lin. ft.; 10" sewers, \$1.00; 60" sewers, \$15. Concrete in man-holes and catch basins, \$8 to \$10 per cu. yd. Rock excavation, \$4 to \$10 per cu. yd.<sup>M10</sup>

### Metering Sewage Sludge

In measuring sludge by means of a Venturi tube, the annular piezometric rings easily become plugged with solids, and one or two openings direct to the interior of the

# The Sewerage Digest

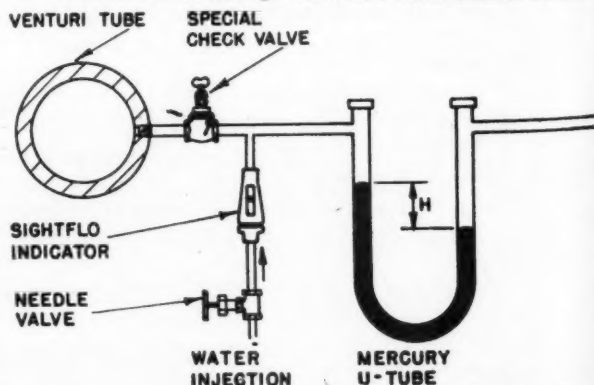
Abstracts of the main features of all important articles dealing with sewage and sewer treatment that appeared in the previous month's periodicals.

tube are more satisfactory, but should be flushed daily. Such meters give fair satisfaction with activated sludge, but primary sludge presents the most serious difficulties. A recent development is believed to eliminate the entrance of sludge particles into the small piping or metering units. Each of the pressure pipes from the inlet and the throat of the meter contains a check valve, a gate valve, a needle valve, and a "sightflo" indicator, and is connected to a water supply, the rate of flow of which is regulated by the needle valves. If the flow of sludge through the meter decreases, the pressure head at the throat increases, tending to cause sludge to flow into the small pipe; but this is prevented by the closing of the check valve. The injection water then builds up a pressure in small pipe until it balances the throat pressure, when the check valve opens again.<sup>G14</sup>

### Bibliography of Sewerage Literature

The articles in each magazine are numbered continuously throughout the year, beginning with our January issue. c. Indicates construction article; n, note or short article; p, paper before a society (complete or abstract); t, technical article.

- Water Works & Sewerage**  
June
14. A New Development in Sludge Metering. Chas. G. Richardson. Pp. 198-199.
  15. Flow and Depth in Circular Channels or Conduits. By Paul McH. Albert. Pp. 200-202.
- Sewage Works Engineering**  
July
34. Sludge Digester Experiences at Findlay, Ohio, Plant. By Ben H. Barton. Pp. 334-336, 350.
  35. Making the Akron Plant Grow Up. By T. C. Schaetzle. Pp. 337-339.
- American City**  
July
9. Elizabethtown Anticipates Tomorrow's Sewage Treatment Needs. By Maurice L. Miller. Pp. 80-81.
- Water and Sewerage**  
June
10. Extensive Sewerage Improvements Planned for Sault Ste. Marie. By G. Graham Reid. Pp. 23-24, 52.
  11. D.D.T. for Mosquito Control. P. 25.
- Public Works**  
July
21. Recent Sewage Treatment Plant Designs. Pp. 15-17, 40.
  22. Heating Coils in Sludge Digestion Tanks. Pp. 24-25.
  23. Treating Metallurgical Wastes in Connecticut. Pp. 30, 32.
  24. Have You a Complete Sewerage System? Pp. 36, 44.
  25. n. Refuse and Garbage Collection Consolidated. P. 44.



Sketch indicating how controlled water injection system functions with changing flow rates through Venturi tubes.

Courtesy Water Works & Sewerage



## The Water Works Digest

(Continued from page 58)

with water. That showing the greatest promise at present is the feeding of minute quantities of chemicals which will form protective coatings. As yet, determination of the initial dosage of chemicals must be based on the experience of others using similar waters. Control of the feed for any particular system must be based upon chemical tests of the water to determine the residual concentrations of the effectual chemicals at the ends of the distribution system, and these must be correlated with results on the pipes themselves. Certain phosphates and silicates have given good results. Analysis of the many different and unusual properties of the newly discovered silica-organic compounds, the silicones, may lead to one or more compounds which will give more positive control than is at present obtainable with the the silicates or phosphates<sup>G25</sup>

### Main Cleaning With Compressed Air

Slater, Mo., obtains its water from two deep wells, from which it is pumped to the purification plant through two miles of 8" cast-iron pipe. A deposit consisting of iron, silt, etc., builds up inside the main and has to be removed at intervals. The deposit, which is about the consistency of fresh wall plaster, is cleaned out once a year by removing a length of pipe mid-length of the line, then pumping 500 gpm from the wells through the mile of pipe nearest them, at the same time forcing into the pipe 210 cfm of compressed air. Then the other mile is cleaned similarly from the purification plant. The air and water come out at the end of the pipe in alternate slugs, loosening the deposit and bringing it out in small pieces. It takes about four hours to clean each mile stretch.<sup>G26</sup>

### Cost-Plus Contracts in England

In a paper before the Institution of Municipal and County Engineers of Great Britain, W. P. Haldane, deputy city engineer of Edinburgh, described the work being done in restoring bombing damage to the cities of southern England. Commenting on this, *The Surveyor* says:

"On the subject of contracts, he explained that almost without exception they were on a cost-plus footing, on the basis of the Prime Cost Contract of the Ministry of Home Security, and he added that it was not unusual to find that the relationship between local authority and contractor was verbal, and that this did not cause much loss of sleep. Very few, he said, have a good word to say for the prime cost contract; at the same time, he reminded his hearers, no genius has produced a better instrument for operating speedily in circumstances of real urgency. That is true; but what is deprecated by engineers and taxpayers is that cost-plus contracts have been entered into when the operations were to be carried out deliberately, occupying relatively long periods of time, and involving expenditure so great that the contractors have received fantastic sums by way of clear profit. Dealing with the more recently issued prime cost contract, Mr. Haldane observed that it is fundamentally of similar character, and pointed out that under the heading 'quality of materials and workmanship' there is a parenthesis reading 'having regard to the skill of labor available to the builder,' adding: 'This seems to me like the beginning of a very dangerous wedge-driving process.' Other engineers, however, may see in that provision nothing more than due recognition of the elementary fact that the cost of a work is related to the efficiency of the workman."

## FLEXIBLE SEWER-ROD SET

*will pay for  
itself 5 times  
every year.*

Flexible Sewer-Rod Equipment pays for itself in a short time because it speeds up the work. A few men can clean more underground pipe than an entire crew can with old, outmoded methods. Flexibles eliminate the time-consuming, hot, unsanitary part of the work.

### ... REQUIRES FEWER DIG-UPS

Flexible methods for cleaning pipe eliminate more than 50% of the necessary dig-ups. When you figure costs for cleaning pipe lines, remember dig-ups are expensive.

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Flexible manufactures a complete line of tools for every type of pipe cleaning job—there are attachments for removing sand, roots, rocks, marine growths and any other stoppages.

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Los Angeles 34, California

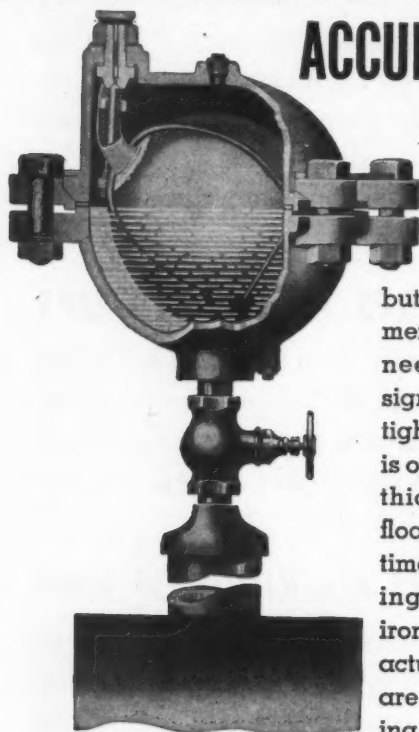
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2845 E. 75th St.  
Chicago 49  
P.O. Box 674, Pittsburgh  
P.O. Box 165, Atlanta  
147 Hillside Ter.  
Irvington, N. Y.

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## IS AIR SABOTAGING YOUR PIPE LINES AND PUMPS?

If not removed, air entrained in a liquid or entering the system through leaky joints and pump suction, may result in serious damage to the pipe line and to the pumping equipment. These air obstructions not only reduce the operating head, but the area of discharge is considerably reduced or entirely cut off.

## SIMPLEX AIR RELEASE VALVES AUTOMATICALLY VENT AIR ACCUMULATIONS



THE Simplex Automatic Air Release Valve is of simple, dependable construction, having but one lever movement which operates a needle valve so designed as to be always tight seating. The valve is operated by a heavy thickness glass ball float, tested to several times the service working pressure. A cast iron shell houses the actuating parts which are of corrosion resisting materials.

Standard Simplex Air Release Valve is for working pressures up to 250 lbs. per square inch. The Type "ARA" valve is similar in design but operates up to 1250 lbs. per square inch. Simplex Air Release Valves are being used extensively on lines and pumps for the release of air in water and sewage lines, oil and gasoline lines, and for industrial process liquids.

Write today for further information on the Simplex Air Release Valve—the automatic watchdog to assure continuous peak flow.

**SIMPLEX VALVE & METER COMPANY**  
6730 Upland Street • Philadelphia, Pennsylvania

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## Creosoted Wood Expansion Joints

For almost 25 years, the City of Wichita, Kansas, has been using pressure creosoted pine for expansion joints in street and alley pavements of concrete. The city now has about 118 miles of such pavement, amounting to over two million square yards, and most of it was laid with these creosoted fillers.

The section in the present standard specification of the City of Wichita pertaining to expansion joints reads as follows:

"Expansion joints at right angles to the gutter and curb shall be placed across the pavement at approximately 30 foot intervals along the street. In case of accidents or breakdowns or other good reasons this space may be reduced to a minimum distance of 15 feet, but if so reduced it must be extended in the same line in the opposite half of the street. These specifications require a construction joint to be parallel to the curb lines in the center of the street, one side of the street to be paved at a time. The transverse expansion joints shall be constructed by digging a trench 6 inches wide and 4 inches deep below the sub-grade of the pavement. In the center of this ditch shall be staked or fastened by any suitable means, a row of creosoted long leaf pine wood blocks, 6 inches in height, of commercial 1-inch or 2-inch lumber set with grain vertical at such elevation that the top of the block is flush with the finished pavement.

"These blocks shall be so placed as to make a continuous row across the street, allowing the concrete to come against them and to fill the ditch below them. They may be made by using lumber of ordinary width but 6-inch will be preferred. There shall be a 1x2 continuous wood strip nailed to the top of the row of blocks with the upper edge of this strip placed level with the finished pavement. Concrete shall be finished with an edge on each side of these strips, after which they shall be removed and the upper inch of the pavement filled with hot mixed asphalt mastic placed at the proper temperature after the final setting of the concrete."

The thin wood strip mentioned above readily bends to the street crown and is merely placed on top of the blocks to preserve their alignment during the passage of the surface finishing machine. If the contractor prefers, he is allowed to substitute for this temporary top strip one of metal, U-shaped, bent to crown and placed in inverted position over the filler blocks until the finishing operation has been concluded. In earlier construction practice, when hand finishing methods prevailed, it was possible to place the filler blocks almost flush with the pavement surface without the aid of an alignment strip. It was not then customary to edge the joint. The thin film of concrete thus deposited over the joint was quickly removed by traffic after the pavement was opened for service, leaving the creosoted wood free to act as joint filler.

The purpose of the concrete deposited in the 6x4-in. trench under the expansion joint is to act as a foundation support for the wood block filler. Under compression stress, this portion of the concrete shears off from the remainder, but thereafter prevents the wood filler from being pounded down out of place by traffic impact.

Pressure creosoted wood filler for expansion joints has given excellent performance in Wichita streets. The joints have required little or no attention and are smooth riding. Maintenance crews have sealed the tops of joints on some streets with hot asphalt, but this has been done primarily to protect the edges of the concrete joints against abrasion by heavy traffic. In this connection, it may be noted that the population of the Wichita area has doubled since 1941 and now approximates 250,000 people.

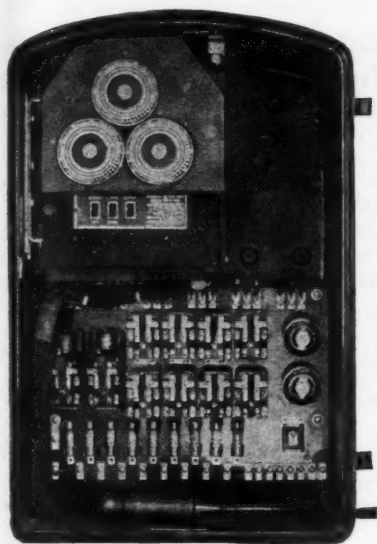
P. L. Brockway is director of public service for the City of Wichita, and L. K. White is city engineer.—*From Wood Preserving News.*



# Keeping Up With New Equipment

## Multi-Dial Traffic Controller

A multi-dial traffic controller which permits automatic changing of signal-interval lengths to correspond with



G.E. Multi-dial traffic controller.

changes in the volume of main and cross-street interesting traffic has been announced by the General Electric Lighting Division at Schenectady, New York. The length of a pedestrian interval can also be changed to correspond with changes in pedestrian volume.

The controller, available with two or three dials, comes in two types, one for isolated intersections and the others for use with single- or other multi-dial controllers in an interconnected system. Each dial is preset for a different traffic condition. When the predetermined condition occurs, a time switch automatically brings the correct dial into operation. A manual switch on the controller panel can be used for operating any of the dials when an unexpected traffic change occurs. In an interconnected system, the device can be used with triple reset and remote-cycle change regardless of which dial is operating.

Each dial has its own dial-contact block, the contacts operating the various controller elements in the same manner as in a single-dial controller. A gear system allows the driving motor to turn all the dials synchronously at the same speed.

As in standard controllers, all parts are large and widely spaced for ready access. The basic design is similar to that of other G-E controllers, with the same parts and subassemblies.

## Calcium Lignosulfonate as a Dispersion Agent in Portland Cement

The results of scientific research sponsored by Master Builders Co., Cleveland, Ohio, recently completed by chemists at Ohio State University and conducted by Dr. Wesley G. France and Fred M. Ernsberger, a research fellow, shows that when cement is placed in water many of the particles clump or flock together. Since tests have shown that the best results are gotten from cement only when each of the countless particles is wet all over, this tendency of the particles to bunch together greatly reduces their combined effectiveness in concrete.

The second step of this investigation showed that the clumps are broken up when a small amount of a lignin product, made from paper mill waste, is added. This product, calcium lignosulfonate, disperses the cement particles by electrostatic action.

It is claimed that tests made for Federal Departments have proved that concrete produced with dispersed cement is stronger, less porous and lasts four to five times longer than when made with plain cement.

**Standard**  
from **COAST**  
All Sizes 2" thru 12"  
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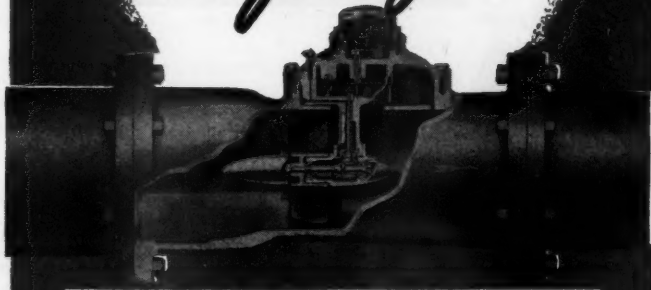
PRECALKED! the pipe comes on the job with lead and redwood wedges in the pipe bells. All you do is "socket the spigot and calk." No skilled labor. No cumbersome equipment. And how that cuts installation time and costs! Investigate!

**Prompt Shipments!**

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**McWane PRECALKED Pipe**

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## IMPROVED PROPELLER-TYPE FLOW METER

Streamline Venturi design gives exceptional accuracy through a wide range of flow with low loss of head. Simple to install; low first cost; low upkeep.

Send for Bulletin 350. Address Builders-Providence, Inc., (Division of Builders Iron Foundry), 16 Coddling St., Providence 1, R. I.

*Sincerely*  
**BUILDERS-PROVIDENCE**

## The Griductor Intercepts the Larger Solids in a Normal Sewage Stream by Screen or Grid Action

The Griductor comprises a semi-circular stationary screen grid with slots of sufficient width to permit mounting a series of rotatable circular screen cutter plates or discs in such a manner that the assemblies form screen slots both above and below each cutter plate. The discs extend outward beyond the face of the grid and form in effect a coarse screen. As these screen discs with the cutter teeth are rotated, the intercepted screenings are dislodged from the screen element and moved to an adjacent sta-

tionary cutting bar or comb. Reduction of the size of the solids is accomplished by the engagement of the cutting comb with the teeth fixed to the edge faces of the rotating screen cutter plate—a shearing action is thus provided. The teeth are staggered on the cutter plate in such a manner that only one tooth at a time can transmit a cutting load.

Each tooth is held in place on the disc by a tooth holder clamp which is recessed deeply into the disc so that the cutting load stress is transmitted to a substantial area of the plate. The tooth holder permits radial adjustment of the cutter tooth so that correct cutting clearance may be maintained.

The cutting edges of both the teeth

and the stationary combs are made of the most durable material available for service of this nature. Both the teeth and the cutter combs may be removed easily for renewal purposes. As both ends of each tooth are sharpened and ground into proper shape, a complete extra set of teeth is furnished with each machine. An additional set of cutter bars may also be had, if desired.

The Griductor is the product of Infilco, Inc. 325 W. 25th Place, Chicago 16, Ill. Write for bulletin 5100.

## Chlorinating Equipment for Treating 12,000,000 Gallons of Drinking Water a Day Shipped by Air

Under the direction of the United States Army Corps of Engineers, New York District, Wallace & Tiernan Co., Inc., of Belleville, N. J., shipped by Army Transport Command planes enough chlorinating equipment to provide 12,000,000 gallons of safe water. This again demonstrates the precedence given by the Army to safe drinking water.

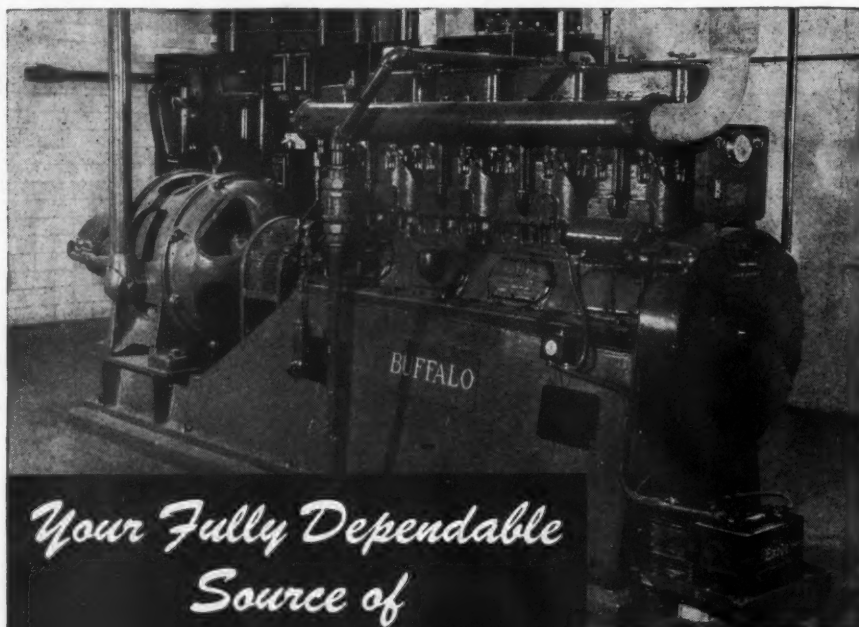
Recently the New York District Engineers advised Wallace & Tiernan of the need for this rush shipment and by extra production and diversion from other contracts the required units were ready on schedule. They were delivered to the Army at an Eastern Air Field where the entire shipment of Portable Water Chlorinating Units was packed in ATC planes for direct air transport to India.

This is another example of the vital importance of water purification and of the tremendous responsibilities being shouldered in this war by the U. S. Army Corps of Engineers.

## G. P. Vincent and R. E. Gage Promoted by Mathieson Alkali Works

G. P. Vincent, Manager of the Sales Development and Technical Service Department of the Mathieson Alkali Works, has been appointed to the newly created position of Technical Director. In addition to his former duties, he will direct research and technical development and advise on technical matters concerning plant operation. In these latter capacities, he succeeds R. E. Gage, who was Director of Research and Development for Mathieson for fourteen years and has now been appointed Technical Advisor of the company.

A native of Cleveland, Dr. Vincent graduated from Hiram College and Cornell University, where he majored in physical chemistry, inorganic chemistry and industrial engineering, and received the degrees of M. S. and Ph.D. In 1930, he became Research Chemist for the Mathieson company, and later held successive posts as Manager of the Research Laboratory, Assistant to the Research Director, and Manager of the Sales Development Department.



*Your Fully Dependable  
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In hundreds of communities the name "BUFFALO" on stand-by engines is assurance of protection against power failure—in public service works, in private industries, in institutions, at airports, at radio stations and in telephone and telegraph communication systems.

For over forty years we have been accumulating this experience and applying it to steady improvement in design, in workmanship and in adaptability to the various duties required.

For the best evidence of their superiority examine Buffalo Engine specifications and inspect installations where their performance can be observed. We invite engineers and others interested to write for complete data and references to installations in any field.

## BUFFALO GASOLINE MOTOR COMPANY

DEPT. PW-85

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BUFFALO ENGINES — 100 H. P. THROUGH 750 H. P. — IN GENERATOR AND PUMPING SETS FOR WATER WORKS — AIRPORTS — COMMUNICATIONS — FLOOD CONTROL — HOSPITALS — INSTITUTIONS — MINES — MOVABLE BRIDGES — THEATRES — SEWAGE PLANTS.

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Mr. Gage, as Technical Advisor for Mathieson, will cooperate with the Technical Director in various lines of research and development. He is a graduate of the Massachusetts Institute of Technology, where he majored in chemistry and chemical engineering. He joined the Mathieson organization as Chief Chemist, in 1916, and later became Chief Chemical Engineer and, in 1931, Director of Research and Development.

#### New Sales Appointments by Allis-Chalmers Tractor Division

W. A. Roberts, Vice President of Allis-Chalmers Mfg. Co. and Manager of the Tractor Division has appointed Marshal L. Noel, previously Industrial Sales Manager and long identified with the Company's Crawler Tractor and road machinery sales, General Sales Manager of the Tractor Division.

#### Fellowships in Traffic Engineering

The Bureau of Highway Traffic, Yale University, offers ten fellowship in Traffic Engineering for the academic year 1945-46. These awards have been made possible through a grant from the Automotive Safety Foundation.

This course of graduate study and research provides a broad foundation in the techniques of traffic operations. It is designed to give the student increased skill and ability in the analysis of traffic problems and to equip him with a thorough knowledge of traffic engineering.

The course of work begins October 1, 1945. Upon successful completion of the course of study, students will be eligible for a "Certificate in Traffic Engineering" subject to the approval of the Committee on Transportation of Yale University.

#### Burton F. Miller Will Head ARBA Contractors' Division

Burton F. Miller has been named Managing Director of the Highway Contractors' Division of the American Road Builders' Association. Mr. Miller has been with the A.R.B.A. for nine years and since 1940 has acted as an executive assistant to Charles M. Upham, engineer-director. His duties in this capacity gave him an intimate knowledge of the activities and objectives of the contractors' division.

#### Yeomans Brothers Company Appoints a New Oregon Representative

Now representing Yeomans in Oregon and southwest Washington is R. M. Wade and Co. of Portland, an organization with an 80 year history. President of the firm is Wade Newbegin, a grandson of Robert M. Wade, founder and first president from 1865 to 1915.

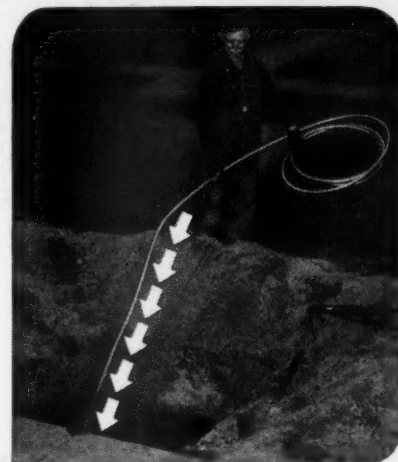
Originally distributors of wagons, buggies and horse-drawn farm implements, the Wade company has broadened its activity to include sales and distribution of pumping equipment, irrigation and water supply systems and other machinery. As Yeomans representatives,



### Replaces worn pipe three times faster than before

Maintenance Shopmen of the Town of Bloomfield, New Jersey, have made a "puller" of their GREENLEE Hydraulic Pipe Pusher. And for good reason . . . to make two or three replacements of worn out household pipe in the day's time normally required for one job with old trenching methods.

On the job illustrated, with a GREENLEE, 34 feet of old 1" galvanized pipe was "pulled" and new 3/4" copper pipe installed in the same operation . . . in less than four hours! With no torn up lawn, tunneling, repaving, extensive back-filling. And done at less than 50% cost of old methods.



NEW PIPE ATTACHED TO OLD AT OUTSIDE CONNECTION. New pipe is drawn underground to house with old as it is pulled out at basement. Small hole shows the only digging and back-filling necessary for this operation.

OLD PIPE OUT, NEW IN. (left) As last section of worn pipe is pulled through wall opening it brings in the new. Note how new pipe was attached to old for drawing under lawn.



With a GREENLEE Hydraulic Pipe Pusher one man can push pipe under lawns, sidewalks, pavement, flooring . . . save valuable time and do the job better. A GREENLEE Pusher can pay for itself the first few times used. For complete information write for free folder S-117. Greenlee Tool Co., 2048 Columbia Ave., Rockford, Illinois.



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the Wade Co. will handle the complete Yeomans lines of sewage, drainage and horizontal pumps, condensate return units, rotary air compressors, vacuum pumps and gas boosters and sewage treatment equipment.

A staff of competent pump specialists has been organized and a complete pump service department is set up to install or service any pumping equipment regardless of size.

#### Lloyd N. Clark Promoted

Lloyd N. Clark, Sn. C., former State Sanitary Engineer of North Dakota, has been promoted to Lt. Col. Col. Clark had charge of the reconstruction and putting into service of the Manila water and

sewerage systems. He arrived in Manila while the fighting was still in progress and directed repair work under sniper, machine gun and artillery fire. For his outstanding work on this job, he received a commendation, his second; the first commendation was for the development of orthotolidine tablets thus doing away with the necessity of carrying liquid orthotolidine in the field and also greatly simplifying the process of obtaining chlorine residuals.

#### Arthur Terry of Dorr Company to Head F.E.A. Reconstruction Program for Netherlands

Arthur Terry, head of The Dorr Company's Contract Engineering Divi-

sion, has been appointed by the Foreign Economic Administration to administer that agency's rehabilitation activities in Holland and Netherlands East and West Indian possessions. Terry's appointment was urged by several members of the F.E.A. staff and a group of Netherlands business men in the United States.

#### Army and Navy Production Award

The Army and Navy Production Award was given the Holt Alabama plant of The Central Foundry Co., 386 Fourth Ave., New York, at a presentation ceremony held July 27th at the Holt plant.

#### Gannett, Fleming, Corddry and Carpenter, Inc. Establishes New York Office

Mr. George F. Axt, manager of our New York office, 50 Broad St., is a graduate of Pratt Institute, and was a graduate student at Harvard University in Architecture. For some years he was a member of the faculty of Pratt Institute in New York, is a registered architect in New York and New Jersey, and a member of the American Institute of Architects.

For three years he was Assistant Regional Supervisor for the Home Owners' Loan Corporation in New York.

Recently he has been Architect Consultant to the Engineer on the New York Municipal Airport at Idlewild.

#### Worthington Promotes Feldbush

Harry A. Feldbush, formerly Works Manager of the Holyoke, Mass. plant of Worthington Pump and Machinery Corporation has been named Vice President in charge of Engineering for the entire Corporation. His duties cover engineering activities of all works and domestic subsidiary companies. His headquarters will be at the general offices in Harrison, N. J.

Ralph M. Watson, formerly chief engineer of the Centrifugal Engineering Division has been appointed Assistant to Mr. Feldbush.

#### Grant M. Hinkamp Now With Allis-Chalmers Mfg. Co.

Mr. Hinkamp, who will correlate Allis-Chalmers interests in public works projects, has had thirty years' experience in public works engineering and construction. A graduate of Purdue University and a member of the American Society of Civil Engineers, he comes to Allis-Chalmers from the Stone & Webster Engineering Corporation where he was in charge of the construction and operation of water works and sewerage systems at many important army projects throughout the country. Previous to the war, Mr. Hinkamp was president of an engineering and construction business in Milwaukee, specializing in water works and sewerage systems, filtration plants, sewage treatment plants, etc. Early experience was received with the Milwaukee Sewerage Commission.

## STRETCH FEDERAL AID

### *the* *Calcium Way*

Government financial support has been provided for postwar secondary roads as well as roads where traffic counts justify paving. How many miles you get depends upon how you use the money.

Low-cost roads need not be poor roads. In fact, some of the finest roads in the country are built the calcium chloride way with local soil materials such as gravel, stone or shell aggregate bound together with moisture provided and retained by calcium chloride.

The use of local aggregates and binder soils consolidated and held moisture bound with calcium chloride, also provides a market for local labor. Best of all, it provides an all-weather road that stays firm in bad weather, resists frost action and is dustless in summer, rain or shine.

Write today. Ask for Bulletins showing the calcium chloride way to low-cost, postwar roads.

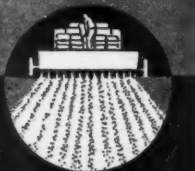
**Calcium Chloride Association**  
4145 Penobscot Building  
Detroit 26, Michigan



Dust is the cement in your gravel road

Molsten it with

**CALCIUM CHLORIDE**





## A New Pipe Coupling

Drinkwater, Inc.  
2323 S. Michigan Ave.  
Chicago 16, Ill.

Faster coupling of pipe at lower cost and with greater flexibility is what is claimed by the manufacturer for the new line of flexible pipe couplings known as Drinkwater Presto-Lock Couplings. (Presto-Lock Couplings are made in 11 sizes from 1 1/4" to 16").

An important feature of these Couplings is that they can be used with any plain end pipe without threads, grooves or flanges. No wrenches or special tools are required in assembly. Only a hammer is needed to tighten wedge keys after the two sections are fitted over pipe ends and wedge keys have been inserted in the key channels.



A Presto-Lock Flexible Coupling, open and applied.

The three simple parts of Presto-Lock Flexible Couplings are the two corrosion-resistant malleable iron castings and the quick-locking wedge key. Sizes 1 1/4", 1 1/2", 2", 2 1/2" and 3" are equipped with one wedge key and chain assembly to prevent loss of coupling parts. Sizes 3" to 16" have two wedge keys but no chain assembly. The gaskets which are used on all Drinkwater Presto-Lock couplings are specially designed to affect a permanently tight seal on all types of pipe lines. Three types of gaskets are available, these being synthetic rubber, neoprene and natural rubber.

Tests by the manufacturer are claimed to show that Presto-Lock Flexible Pipe Couplings give up to 40 degree flexibility at each joint. In other words, they can be used for repairing any size leak that the coupling will cover and they withstand all normal working pressures of water, gas and steam.

### Northrop & Company To Handle Clayton Control Valves

The Clayton Manufacturing Co. of Alhambra, Calif., announces the appointment of Northrop & Company, Inc., 50 Church Street, New York, N. Y., as their eastern distributors to

## HOW TO improve appearance and save money ON CONCRETE CURB, GUTTER AND SIDEWALK

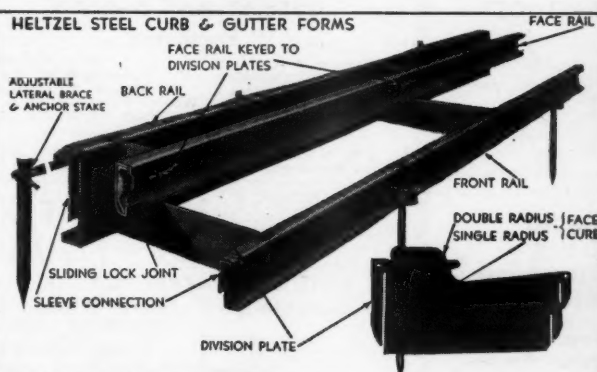
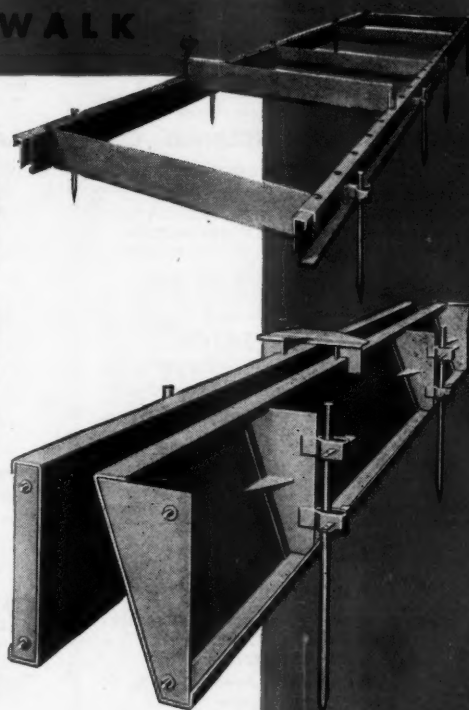
You buy Heltzel Steel Forms once. They stay in service for 20 years or more and each job you set is as uniform as the ones before. The low cost of the equipment per year of service plus the benefits of faster work with the use of forms net substantial savings.

Rigid, self-interlocking Heltzel Steel Forms make the setting and stripping job much easier and faster. No warping, no chipping, no replacements.

Heltzel has been engineering steel forms for 36 years. No matter how complicated or individual your specifications, we can furnish forms for your work.

Purchase of Heltzel Steel Forms for municipal sidewalks, gutters, and curbs enables cities and towns to establish a sound employment program. No other method for setting concrete offers so many advantages.

Write today for engineering data Bulletin A-20-F on Heltzel Steel Forms.



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Curbs, Curb and Gutters, or Sidewalks"

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(Type of construction usually engaged in)

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FINISHING TOOLS FOR CONCRETE ROADS

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(Continued from page 68)

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Most of these units are available from stocks in Chicago at the present time.

## NEW CATALOGS

Below are described the latest catalogs received by PUBLIC WORKS. All are available free on request to the manufacturers whose names are given.

### Builders Issues New Bulletin on Sewage Treatment

Builders-Providence, Inc., (Division of Builders Iron Foundry), Providence, R. I., has just released a new 20-page edition of their popular Bulletin, "Measurement, Control and Chemical Treatment of Sewage and Sludge." This Bulletin has been prepared for engineers and others engaged on sewage treatment problems and plant layouts for both large and small communities. It contains much interesting and valuable information, and is fully illustrated. There are also descriptions of chemical feeders and new types of indicating,

recording and integrating flow instruments for connection to such primary units as Venturi Tubes, Orifices, Kennison Nozzles, Parshall Flumes and Conveyor Scales. Useful reference diagrams are also included. A copy of this new Bulletin 287A may be had by writing Builders-Providence, Inc., 9 Coddington St., Providence 1, R. I.

### Bitumastic No. 50 is Described in a 4 Page Folder

It is a thick film coating for protecting metal and concrete surfaces against severe corrosive and deteriorating conditions. The manufacturers, Wailes Dove-Hermiston Corp., Westfield, N. J., say "One application of Bitumastic No. 50 is equal to from 5 to 8 coats of ordinary paint." Among the typical applications are Cast Iron Pipe, Meter and Curb Boxes, Sewage Plant Equipment, Underground Pipe Lines, Bridges, etc.

### A Four Page Folder on Rate-of-Flow Indicators

The indicators are used for checking capacities of pumps, ascertaining whether filters are operating at correct rates, determining whether filters are being properly backwashed, indicating whether valves have to be adjusted and where one water stream is broken up into two or more. The indicators may be obtained for indicating the flow in either one or both directions through the venturi tube or orifice. Bulletin 1070 gives complete description. The manufacturers, Infilco, Inc., 325 W. 25th Place, Chicago 16, Ill., will send a copy upon request.

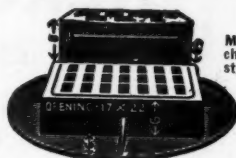
### A New Bulletin On Accelo-Filter

In a 12 page folder the Accelo-Filter System for the treatment of sewage and organic waste is described. It includes filter flow diagrams; two charts giving a comparative 5-day B.O.D. removables at various hydraulic loadings, and comparative efficiencies at various loading rates, a table of performance data at several installations.

A page entitled "Design Simplicity" shows in drawings and description how easy it is to include the direct recirculation feature of the Accelo-Filter System in any complete treatment plant.

Write Infilco, Inc., 325 W. 25th Place, Chicago 16, Ill., for Bulletin 6200.

### STREET, SEWER AND WATER CASTINGS



Made from wear-resisting chilled iron in various styles, sizes and weights.

MANHOLE COVERS  
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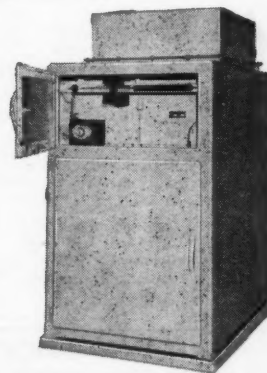
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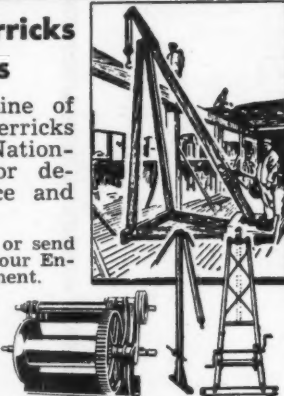


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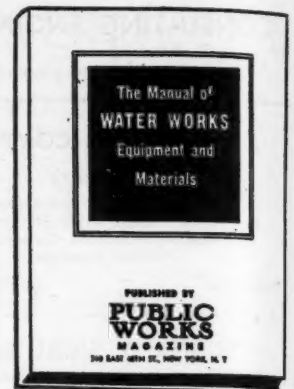
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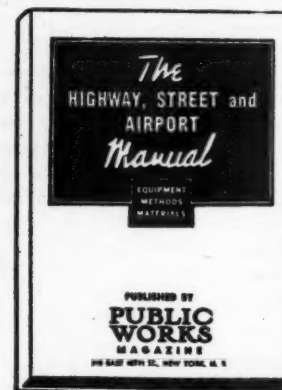
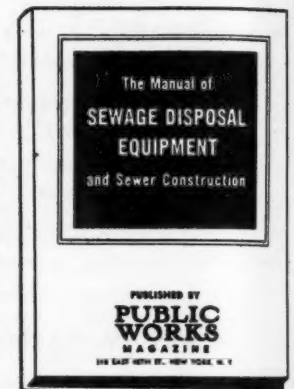


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419. Double-disc gate valves; hydraulically operated valves; air, check, flap and mud valves. Fire hydrants with sliding gate or balanced valve. A 32-page catalog. Ludlow Valve Mfg. Co., Inc., Troy, N. Y.

#### Gauges

421. The full line of Simplex gauges for filtration plants are illustrated and described in catalog issued by Simplex Valve and Meter Co., 6750 Upland St., Philadelphia 42, Pa.

#### Generating Sets, Diesel

422. New booklet describes Sheppard Diesel Generating Sets that make low cost electricity from cheap fuel and give dependable service in the hands of any average operator. Write R. H. Sheppard Co., 250 Middle St., Hanover, Pa.

#### Manhole Covers and Inlets

429. Street, sewer and water castings in various styles, sizes and weights. Manhole covers, water meter covers, adjustable curb inlets, gutter crossing plates, valve and lamphole covers, ventilators, etc. Described in catalog issued by South Bend Foundry Co., Lafayette Boul. and Indiana Ave., South Bend 23, Ind.

#### Meter Setting and Testing

431. The most complete catalog we have seen on setting and testing equipment for water meters—exquisitely printed and illustrated 48-page booklet you should have a copy of. Ask Ford Meter Box Co., Wabash, Ind.

#### Meters, Venturi

432. New bulletin illustrates Builders Air Relay system of transmission for the Venturi Meter which is particularly useful for liquids containing suspended solids like sewage. Eliminates corrosion, clogged pipes, etc. Write Builders-Providence, Inc., 9 Coddling St., Providence 1, R. I.

433. "The Selection of Main Line Meters," a highly informative and useful presentation prepared by a competent engineer, J. C. Thorsen, describes forms of differential producers and quickly solves typical problems with the use of graphic charts. Write Builders-Providence, Inc., 9 Coddling St., Providence 1, R. I.

#### Pipe, Cast Iron

437. Cast iron pipe and fittings for water, gas, sewer and industrial service. Super-deLavau centrifugally-cast and pit-cast pipe. Bell-and-spigot, U. S. Joint, flanged or flexible joints can be furnished to suit requirements. Write U. S. Pipe and Foundry Co., Burlington, N. J.

438. "Cast Iron Pipe and Fittings" is a well illustrated 44 page catalog giving full specifications for their complete line of Sand Spun Centrifugal Pipe, Fire Hydrants, Gate Valves, Special Castings, etc. Will be sent promptly by R. D. Wood Co., 400 Chestnut St., Philadelphia 5, Pa.

439. McWane Precaulked Joint Cast Iron Pipe, in all sizes from 1½ through 12 inches for water and sewerage, equipped with various type of factory-made joints, as well as B. & S. joints. Illustrated booklet issued by McWane Cast Iron Pipe Co., Birmingham, Ala.

#### Pipe Forms

440. Making concrete pipe on the job to give employment at home is the subject of a booklet by Quinn Wire & Iron Works, 1621 12th St., Boone, Ia., manufacturers of "Heavy Duty" Pipe Forms. Sent promptly on request.

#### Pipe Pusher

444. One-man-operated Hydraulic Pipe Pusher pushes pipe through ground under streets, sidewalks, lawns and other obstacles. Pays for itself in man hours saved on first few jobs. For complete facts and prices, ask for booklet S-117. Greenlee Tool Co., 2042 Columbia Ave., Rockford, Ill.

#### Pipe, Transite

445. Two new illustrated booklets, "Transite Pressure Pipe" and "Transite Sewer Pipe" deal with methods of cutting costs of installation and maintenance of pipe lines and summarize advantages resulting from use of Transite pipes. Sent promptly by Johns-Manville Corp., 22 East 40th St., New York 16, N. Y.

#### Pipe Joints, Sewer

447. How to make a better sewer pipe joint of cement—tight, minimizing root intrusion, better alignment of joint. Permits making joints in water-bearing trenches. General instructions issued by L. A. Weston, Adams, Mass.

#### Pipe Joint Compounds

450. The uses of Tegul-Mineralad for bell and spigot pipe and G-K Sewer joint compound are described in a 16-page illustrated booklet issued by Atlas Mineral

Products Co., Mertztown, Pa. Includes useful tables for estimating quantities needed.

#### Pumps, Sludge

451. Carter Sludge Pumps are described in 8-page illustrated bulletin, including specifications and tables. Address: Ralph B. Carter Co., Hackensack, N. J.

#### Pumps and Well Water Systems

454. Installation views and sectional scenes on Layne Vertical Centrifugal and Vertical Turbine Pumps fully illustrated and including useful engineering data section. Layne Shutter Screens for Gravel Wall Wells. Write for descriptive booklets. Advertising Dept., Layne & Bowler, Inc., Box 186, Hollywood Station, Memphis 8, Tenn.

455. Peerless pumps in a variety of types, with oil or water lubrication and any power drive, to pump water from any depth are described and illustrated in new literature that clearly shows their construction and special features. Write Peerless Pump Div., Food Machinery Corp., 301 W. Ave. at 26th St., Los Angeles 31, Calif.

456. Oil lubricated turbine pumps with open impellers. Five types of heads available. Specifications and illustrations in new bulletin 6930M-2 issued by Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.

457. Centrifugal Pumps of various designs—single-stage, double-suction, split casing; single-stage single-suction; two-stage opposed impeller; three-stage; high-pressure; fire pumps; close-coupled. A bulletin for each type. Peerless Pump Div., Food Machinery Corp., Quincy, Ill.

#### Sludge Drying and Incineration

462. "Disposal of Community Refuse by Incineration" is a handsome 34-page booklet that discusses incineration from a commonsense standpoint. Illustrated by numerous photos of typical installations and includes diagrammatic outlines of various plant designs. Write Morse Boulder Destructor Co., 207-P East 42nd St., New York 17, N. Y.

463. Recuperator tubes made from Silicon Carbide and "Fireclay" Corebustors for maximum efficiency are described and illustrated in bulletin No. 11 issued by Fitch Recuperator Co., Plainfield National Bank Bldg., Plainfield, N. J.

#### Softening

466. This folder explains the process of Zeolite water softening and describes and illustrates the full line of equipment for that purpose made by the Graver Tank & Mfg. Co., 332 So. Michigan Ave., Chicago 4, Ill. Includes flow charts, tables and other valuable data. Write for a copy of this instructive folder.

467. Water Softening. The use of the Spaulding Precipitator to obtain maximum efficiency and economy in water softening is described in a technical booklet. Permutit Co., 330 W. 42nd St., New York 18, N. Y.

#### Sprinkling Filters

469. Design data on sprinkling filters of Separate Nozzle Field and Common Nozzle Field design as well as complete data on single and twin dosing tanks, and the various siphons used in them, for apportioning sewage to nozzles. Many time-saving charts and tables. Write Pacific Flush Tank Co., 4241 Ravenswood Ave., Chicago 13, Ill.

#### Stand-by Motors

471. Buffalo stand-by motors for generators or pumping units are covered in illustrated specification sheets sent promptly by Buffalo Gasolene Motor Co., Dept. PW, Buffalo 3, N. Y.

#### Swimming Pools

474. Data and complete information on swimming pool filters and recirculation plants; also on water filters and filtration equipment. For data, prices, plans, etc., write Roberts Filter Mfg. Co., 640 Columbia Ave., Darby, Pa.

475. A new illustrated bulletin on Graver Swimming Pool Equipment. Especially valuable to municipal and consulting engineers for use in writing up swimming pool specifications. Issued by Graver Tank & Mfg. Co., 332 So. Michigan Ave., Chicago 4, Ill.

#### Taste and Odor Control

476. "Taste and Odor Control in Water Purification" is an excellent 92-page, illustrated booklet covering sources of taste and odor pollution in water supplies and outlining the various methods of treatment now in use. Every water works department should have a copy. Write Industrial Chemical Sales Div., 230 Plum Ave., New York 17, N. Y.

477. Technical pub. No. 207 issued by Wallace & Tiernan Co., Inc., Newark 1, N. J., describes in detail taste and odor control of water with BREAK-POINT Chlorination, a method of discovering the point at which many causes of taste may be removed by chlorination with little or no increase in residual chlorine. Sent free to any operator requesting it.

#### Treatment

479. "Safe Sanitation for a Nation," an interesting booklet containing thumbnail descriptions of the different pieces of P.F.T. equipment for sewage treatment. Includes photos of various installations and complete list of literature available from this company. Write Pacific Flush Tank Co., 4241 Ravenswood Ave., Chicago 13, Ill.

480. New booklet (No. 1642) on Link-Belt Circuline Collectors for Settling Tanks contains excellent pictures; drawings of installations, sanitary engineering data and design details. Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.

481. New 16-page illustrated catalog No. 1742 on Straightline Collectors for the efficient, continuous removal of sludge from rectangular tanks at sewerage and water plants. Contains layout drawings, installation pictures and capacity tables. Address Link-Belt Co., 2045 West Hunting Park Ave., Philadelphia 40, Pa.

482. "Sedimentation with Dorr Clarifiers" is a complete 36-page illustrated catalog with useful design data. Ask The Dorr Company, 570 Lexington Ave., New York 22, N. Y.

483. A combination mechanical clarifier and mechanical digester. The Dorr Clarigester is explained and illustrated in a bulletin issued by The Dorr Company, 570 Lexington Ave., New York 22, N. Y.

484. Preflocculation without chemicals with the Dorco Clariflocculator in a single structure is the subject of a new booklet issued by The Dorr Company, 570 Lexington Ave., New York 22, N. Y.

485. New illustrated folder on Straight-line apparatus for the removal and washing of grit and detritus from rectangular grit chambers. Address: Link-Belt Co., 2045 West Hunting Park Ave., Philadelphia 40, Pa.

486. 28-page catalog describes and illustrates the Dorco Hydro-Treator, a self-contained water treatment unit combining Flocculation, Sludge Thickening and Clarification. Reduces treatment time and lowers plant construction costs. The Dorr Co., 570 Lexington Ave., New York 22, N. Y.

488. "Packaged" Sewage Treatment Plants, specifically developed for small communities—100 to 3,000 population. Write for full description and actual operating data for this type of plant. Chicago Pump Co., 2438 Wolfram St., Chicago 18, Ill.

489. "Carter Controlled Flocculation" is title of illustrated folder available on request from Ralph B. Carter Co., Hackensack, N. J.

490. New bulletin fully describes and illustrates Hardinge sludge collectors for clarifiers, sludge concentration and skimming in both circular and rectangular tanks. Write Hardinge Company, Inc., York, Pa.

#### Valves (See Gates, Air Release, etc.)

#### Water Treatment

494. New special folders contain the latest information on High Test Calcium Hypochlorite, Caustic Soda, Soda Ash, or Chloride of Lime as manufactured by Hood Chemical Co., 1819 Broadway, New York 23, N. Y. Write for desired folders, or use coupon in this section.

495. If you have a water conditioning problem of any kind, write Graver Tank & Mfg. Co., 332 So. Michigan Ave., Chicago 4, Ill., who manufacture all types of conditioning equipment and will be pleased to make recommendations.

496. "Use of copper sulphate in water treatment plants" titles informative booklet, with valuable data on chemicals, dosage, etc. Write Tennessee Corporation, Atlanta 1, Ga.

497. Ferri-floc Ferric Sulphate—a new, valuable booklet on coagulation for water and sewage treatment plants. Write Tennessee Corporation, Atlanta 1, Ga.

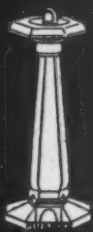
#### Water Service Devices

506. Data on anti-freeze outdoor drinking fountains, hydrants, street washers, etc., will be sent promptly on request to Murdock Mfg. & Supply Co., 426 Plum St., Cincinnati 2, Ohio.

## AMERICA IS BLESSED

In contrast to the rest of the world our people are blessed to have fresh drinking water available almost everywhere.

Each drink from a MURDOCK Outdoor Drinking Fountain is fresh from the water main and no water remains in fixture to get warm, stale, unpalatable.



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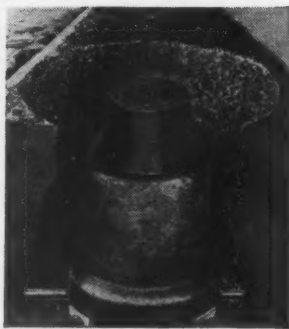


ANTI-FREEZING  
COMPRESSION  
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LARGE  
ANTI-FREEZING  
HYDRANTS  
1/2" TO 2"  
INCLUSIVE

## for MAXIMUM FROST PROTECTION



Ford Double-lid Meter Box Covers have a dead-air space in the neck and a sloping skirt which cut down heat loss to the minimum. They are recommended for water meter settings where climate and soil conditions demand maximum protection against freezing.

Information on request.

## FORD

*Meter Box Co.*  
WABASH, INDIANA

### Dr. Clair N. Sawyer Made Associate Professor of Sanitary Chemistry at M. I. T.

The appointment of Dr. Sawyer is part of the plan to expand the program in sanitary engineering by Massachusetts Institute of Technology to meet the anticipated post-war demand for sanitary engineers. He will be concerned with the teaching of the operational phases of sanitary engineering including sanitary chemistry, water analysis, and fundamental research in water, sewage and industrial waste treatment and stream pollution abatement.

Dr. Sawyer has been particularly active in research work relating to activated sludge oxidations, including the technique of biochemical oxygen demand tests. His present research assignment with the South Dakota State Board of Health has to do with a complex technical problem in the operation of an activated sludge sewage treatment plant at Sioux Falls, S. D., which also receives strong industrial wastes from a large packing house.

Dr. Arthur T. Ippen, assistant professor of civil engineering in charge of the hydraulic laboratory at Lehigh University, and widely known for outstanding research and professional activities in the field of hydraulics, has been appointed associate professor of hydraulics in the department of civil and sanitary engineering. The development of a new hydraulic laboratory is anticipated among the important post-war plans of the Institute.

Born in London, England, in 1907, Dr. Ippen graduated from the Technical University at Aachen, Germany, in 1931, following which he was an exchange fellow at the Institute of Hydraulic Research at the University of Iowa.

### LaPlant-Choate Appoints New District Representatives

The following appointments have been announced by LaPlant-Choate Manufacturing Company, Cedar Rapids, Iowa.

K. V. Turner, who has been with the company in various sales capacities for several years, has been named a district representative and placed in charge of the company's Washington, D. C., office. His territory includes parts of Virginia, West Virginia, Maryland, Pennsylvania, New Jersey and New York.

A. C. Cartwright, formerly district representative in Mexico City, is now district representative for the southeastern territory with headquarters at Atlanta, Ga.

Milo Davin, formerly central area service manager, has been placed in charge of the Central West territory as district representative with headquarters in Cedar Rapids, Iowa.

S. I. Harris, well known in the western states, resumes his old post as district representative for northern California and Nevada with headquarters at San Leandro, Cal., after two years as a major with the armed forces in India and China.

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